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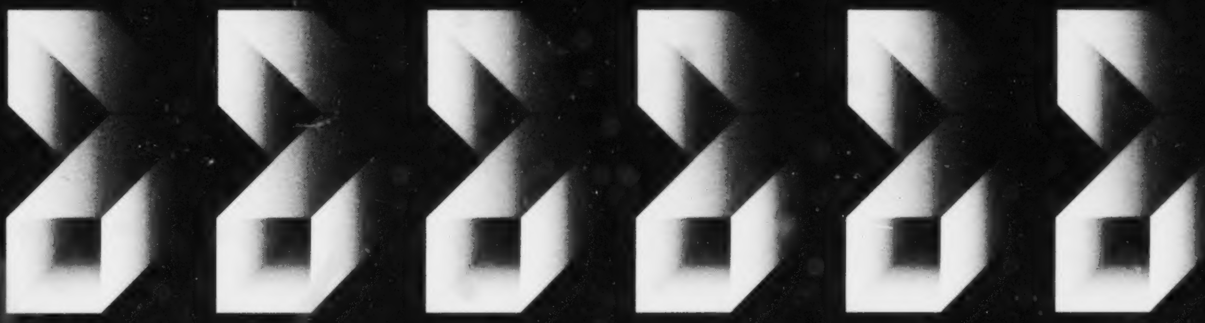

R.F.I. INTERVIEWS, MAIL SURVEY, AND INDICATORS WORKSHOP: TECHNICAL REPORT #5

EVALUATION OF THE ENVIRONMENTAL HAZARDS PROGRAM

August 1995

Canada

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ENVIRONMENTAL HAZARDS PROGRAM EVALUATION

INTERVIEWS, MAIL SURVEY AND INDICATORS WORKSHOP

FINAL REPORT

Prepared for:

Program Evaluation Division
Health Canada

By:

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and

The ARA Consulting Group Inc.

NOTE:

This consultant's report was prepared for Program Evaluation Division, Policy and Consultation Branch, Health Canada, as part of the Division's evaluation of the Department's Environmental Hazards Program, under consulting contract 94-N012.

The analysis, conclusions and recommendations found in this consultants' report are those of its authors and are not necessarily shared by the Department of National Health and Welfare.

FOREWORD

This report contains findings and conclusions from research conducted as part of the evaluation of Health Canada's Environmental Hazards Program. The findings and conclusions are presented in accordance with the three research methods employed; interviews with federal officials outside Health Canada and with non-federal stakeholders; a mail survey of a sample drawn from mailing lists provided by the Chemical Hazards Bureau, Radiation Protection Bureau, and Health Protection Branch; and a workshop specifically on the topic of indicators or program impact.

This project was carried out by Resource Futures International (RFI); assisting RFI, and responsible for the mail survey, was The ARA Consulting Group.

EXECUTIVE SUMMARY

INTRODUCTION

The Program Evaluation Division is conducting an evaluation of the Environmental Hazards Program of the Health Protection Branch, Health Canada.

As part of this overall evaluation, Resource Futures International, in association with The ARA Group, carried out three methods of data collection to obtain the views and opinions of a variety of program clients and stakeholders on a number of evaluation questions. These data collection methods are:

Interviews

Forty-eight in-person (both face-to-face and telephone) interviews were conducted with federal officials outside Health Canada and with non-federal clients and stakeholders to provide insight to the full range of evaluation questions. Interviews with Health Canada officials were conducted by Program Evaluation Division staff; while these interviews were not part of the contracted research reported herein, the two efforts were coordinated.

Mail Survey

A larger and much broader sample of individuals drawn from a master mailing list prepared by the Program Evaluation Division were surveyed by mail. In addition to gauging overall awareness of the Environmental Hazards Program, the mail survey was to provide information on how effectively the Environmental Hazards Program is perceived to be communicating with specific interest groups and with the public about actual exposure to radiation and chemical hazards and about known health risks from such exposure; how timely and useful they consider the information to be; and what would the consequences be if the Environmental Health Directorate no longer provided this information, and where would people turn to for comparable information and advice.

Workshop

The purpose of the workshop was to further determine the existence of, or to suggest, acceptable indicators of the Environmental Hazards Program's impact. Specifically, the desire was to investigate indicators of the impact of the program *as a whole,* and not just in relation to its ultimate objective; namely, a reduction of human morbidity and mortality.

The one-day workshop was held in Ottawa, April 4, 1995. In excess of 30 individuals, predominantly from within Health Canada, but including others from outside the Department familiar with indicators, participated.

FINDINGS AND CONCLUSIONS

The three research methods used each had a fundamentally different focus. Consequently, rather than attempt to combine the research findings and conclusions, these are presented separately as follows:

Interviews with Federal Officials Outside Health Canada and with Non-Federal Stakeholders

Proximity

There is a strong correlation throughout the research findings between what may be referred to as the "proximity" to EHD of other federal government departments and agencies, other governments, and certain organizations (i.e., those with close working relationships and collaborative efforts) and awareness of the Directorate and the Environmental Hazards Program, and the favour with which both are looked upon. Conversely, those not in close proximity are more inclined to question the extent of coordination of activities, effectiveness of communications, indispensability of EHP information, program contribution, and so forth.

Coordination

Coordination of activities with other federal government departments and agencies and the provinces is judged to be working well. PSL and the demands it created appear to have been somewhat of an indoctrination in cooperative efforts for Health Canada and Environment Canada staff.

Ad hoc communications are preferred and work well. Excellent contacts exist with Directorate staff, and certain individuals are held in high regard.

EHD is generally applauded for its science-based approach to risk assessment. It is also viewed as very credible, due in large part to the maintenance of a scientific advice versus advocacy stance.

PSL Assessments

There is some dissatisfaction all around (i.e., both government and non-government players) with the front-end consultation process that was used. Lessons have apparently been learned and expectations are that the process in PSL^2 will change. Stakeholders want less of a "black box" approach and of the "heads up" surprises which characterized PSL's first phase.

Radiation Emitting Devices Act and Regulations

Neither compliance nor enforcement appear to be issues. Other than the wish that attention be paid to updating codes and standards, and that these be distributed to the right people, no changes to either the Act or Regulations were identified.

Effectiveness of Communications

Two de facto program strategies - the provision of scientific advice to a set of "internal" clients, and outreach communications to the general public - present a conundrum. It is generally accepted that EHD does a far better job in the former than in the latter. The problem is that the same strategy (and the same communications objectives, messages, content and style, etc.) naturally does not work equally well for both target audiences.

Neither the Directorate nor the Program have much profile in the public domain. This finding raises a fundamental question which was not explored; namely, how does EHD in fact wish to position the Program, and what are the corresponding communications objectives and strategies?

Protection of Health and Safety of Canadians

Clients rate EHD advice and information as timely and useful and feel that there is no alternative to what is considered to be a valuable and essential national service and support.

The Directorate and the Program are believed to be making a significant contribution to the protection of the health and safety of Canadians from environmental hazards. This contribution, however, must be viewed in the context of the EHP in combination with other initiatives; i.e., not in isolation, but as value-added.

The development of indicators will be difficult and may require revisiting EHP program outputs and expected results to see how these could be refashioned so that they lend themselves to quantitative measurement or qualitative assessment.

Mail Survey

Sample Limitations

It is speculated that there are indeed audiences for whom the EHP information is useful; however, these cannot be easily identified through a rather general mail survey and a sample based as it was on the mailing lists provided. Nor are there any known benchmarks against which to compare survey measures. This is not to criticize the methodology, but merely to point out its practical limitations. Only with a significantly larger and more costly research effort would it be possible to identify the true population for whom EHP information is really useful.

Awareness and Usefulness of the EHP

The results overall point to EHP's communications efforts being of low to moderate usefulness to respondents in general. In particular, there is only moderate awareness of the EHP and its activities or communications products among our survey samples, and correspondingly little use of many EHP information products and services. However, when the products and services were actually used, they appeared to be moderately useful, and a modest proportion of communications were very useful. Furthermore, many people thought EHP was working in areas relevant to their organization and would like more information about the program.

Why communications were judged useful spanned a variety of reasons. In the private sector, reasons included ensuring worker safety and safety compliance and enabling the company to provide goods and services in the environmental health areas. For government agencies and health care organizations, the EHP data were often used to provide information and advice for themselves and for clients. In both cases, some of the information used appeared to be of a "general interest" nature and some very subject or issue specific.

There were no responses provided that were specific enough to allow examples of explicit health and/or safety improvements to be cited.

A significant amount of EHP's communications is judged not very useful, even for respondents with a high level of interest in specific environmental health areas. The reasons for this are not known, and the analysis of the open-ended comments was not particularly enlightening. The technical quality of the communications seems to be reasonably good, although with room for improvement, perhaps especially for technical experts.

Impact of Eliminating the EHP

Eliminating the EHP as a source of information and advice would not affect most of the general respondents. Among those with a strong interest in chemical and radiation hazards, however, roughly equal numbers would experience little impact, or would feel a moderately negative effect. Very few respondents would not bother trying to replace the lost information. On the other hand, equally few believe they couldn't replace it.

In the open-ended comments, respondents were also split roughly in half, with some indicating that EHP communications provided a certain degree of value added, and some saying comparable information was easily available elsewhere.

To the extent that the EHP communications have a small impact on some of the survey measures, this may well be due to the general nature of the contact names in Health Canada's database: we may not have sampled many people for whom this information is critical. However, this is a difficult notion to test with our survey data.

General conclusions which can be drawn from the mail survey data are as follows:

1. EHP communications appear to be going mainly to people with relatively high interest in the relevant environmental health areas. This is particularly true for respondents in the areas of government, industry, health care, and research. There is, however, some indication of inefficiency in distribution: the most important people may not always be reached, and some of the people reached have only a passing interest in the EHP products.

2. If one assumes that the mailing lists provided represent people who would truly get value from its publications, then there is clearly room for improvement in the manner in which the EHP informs its audiences about its activities and products, and distributes this information and these products.

3. The quality of the communications products appears generally sound. However, there is some reason to think that some improvements could be made. These improvements should be made on a strategic basis, as some respondents indicated the EHP material was too technical, others that is was not technical enough. This could indicate that it is either "just right", or that it is not differentiated enough for different audiences.

4. Our primary impression is that there are no clear distinguishing features which make the EHP activities and communications products different

from, or better than, those of other organizations. In services and social marketing terms, this is referred to as perceptual positioning. The open-ended comments were the most illuminating on this score - but because of what they did **not** say, not what they did! The scarcity and lack of detail in these comments is, in our experience, quite unusual: in other evaluations, many respondents who comment on programs they find useful go to considerable lengths praising the uniqueness, value, and importance of the programs' benefits. Often they attach separate pages extolling the program's virtues. Virtually no one did so here.

Ideally, the EHP should provide products and services that are in some way unique; for example, a uniquely Canadian focus and interpretation; the most timely information through electronic means; the best personal servicing of requests; the integration of research and information activities of all relevant Canadian agencies; and so forth. Without such a unique focus, the EHP runs the danger of providing information that is only "nice to have", but not essential.

Indicators Workshop

There were several inputs to the workshop findings; in addition to input provided by participants themselves (in plenary and working group sessions), we should not overlook the pre-workshop materials provided to participants, including the paper by Michael Holliday, *Musings on Health and Environment Indicators*, and the summaries of interviews with officials within and outside Health Canada.

Indirect Indicators of Impact

A significant degree of unanimity exists among these inputs. All agree with the difficulty, if not impossibility of generating indicators of the ultimate impact of the program upon a reduction of human morbidity and mortality. There is concurrence that measures of risk reduction offer a viable alternative to gauging program impact, and that more indirect, "softer" measurements of program impact can, and should be used.

Possible Indicators

Beyond this point, suggestions regarding specific indicators offered by the participants and contained in the pre-workshop materials do not so much disagree, but simply expand into a number of possibilities. Interviews with officials in other government departments and other non-government stakeholders (i.e., program clients) tended to focus not surprisingly on "user-related" indicators such as use of program outputs and users' perceptions of their value. PED's interviews with officials within Health Canada produced a more functional and potentially useful categorization of alternative indicators as follows:

- management process indicators (i.e., monitoring outputs)
- risk management guideline indicators (use of outputs)
- environmental hazard exposure indicators (e.g., hospital admissions)
- toxicity and contamination indicators
- public awareness indicators
- public behaviour indicators
- individual health status indicators

In his paper *Musings on Health and Environment Indicators,* Holliday offered a taxonomy of indirect but more scientifically based indicators of exposure reduction. The "article of faith" that must be accepted, however, is that a reduction of exposure will indeed result in a reduction of health risk. Furthermore, the challenge is to link program activities to a measured reduction in exposure. And of course, it assumes that the right hazards are in fact being measured.

While the workshop itself may not have come to any conclusions regarding specific indicators to use in the future, a number of candidate indicators were identified for further consideration.

The workshop provided the opportunity to explore the fundamental issues discussed above. Especially significant was the acknowledgement that the objective we are attempting to measure is perhaps inappropriate; rather than indicators of a reduction in human morbidity and mortality, it would be more productive to generate indicators of risk reduction, and specifically, indicators of the program outputs and expected results related to risk reduction.

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1.0 INTRODUCTION

1.1 Background

The Program Evaluation Division is conducting an evaluation of the Environmental Hazards Program of the Health Protection Branch, Health Canada. The purposes of this evaluation are:

- Provide senior management of Health Protection Branch and Environmental Health Directorate with objective information and advice about the effectiveness of the Program's activities and services

- Provide accountability reporting according to the Treasury Board Program Evaluation Policy and the Health and Welfare Canada Program Evaluation Policy

- As appropriate, help provide Departmental input into Environment Canada's program evaluations of the Canadian Environmental Protection Act (CEPA) and of EC's Environment Protection program.

1.2 Research Objectives

The overall objective of the research reported herein is to provide the Program Evaluation Division with a technical report summarizing the results of interviews, a mail survey and a workshop on the topic of program indicators which formed part of the data collection for the above-mentioned evaluation.

The research addresses the customary program evaluation issues of program design and rationale, effectiveness, impacts and alternatives.

This particular evaluation is mandated by its terms of reference to examine seven evaluation questions which were detailed in the evaluation's Terms of Reference. Five of these questions are included within the scope of this contract's research and are presented below.

3. Coordination of Environmental Hazards Program activities with other federal departments and agencies, and the provinces.

   Do adequate mechanisms exist to ensure productive coordination, ensure overall cost effectiveness where responsibilities are shared, identify gaps in mandates, and avoid overlaps and duplications?

Is there sufficient input from Health Canada into other departments and other governments regarding their health messages to the public concerning the health risks arising from environmental sources?

4. Officials in Environmental Health Directorate's Bureau of Chemical Hazards and in Environment Canada completed assessments of the toxicity of 44 priority substances under the Canadian Environmental Protection Act (CEPA), in February 1994.

   What was your organization's involvement, if any, with the Bureau of Chemical Hazards in completing these assessments?

   What have been the consequences, if any, of these assessments for your organization? Are there further steps or consequences arising from the completion of these assessments that you expect will involve or affect your organization?

5. What is the effectiveness of Environmental Health Directorate's administration of the Radiation Emitting Devices Act and Regulations?

   5b. What is the extent of industrial and institutional compliance with regulatory actions and decisions taken under the Radiation Emitting Devices Act, as far as you are aware? Are there problems with the enforcement of these actions and decisions?

   5c. Are there aspects of the administration of the Radiation Emitting Devices Act and Regulations that should be changed, dropped or replaced with alternative approaches?

6. How effectively does the Environmental Hazards Program communicate with specific interest groups and with the public about actual exposure to radiation and chemical hazards, and known health risks from such exposure?

7. How and to what extent has the Environmental Hazards Program protected the health and safety of Canadians?

   7a. Environmental Health Directorate provides information and advice to governments, departments, agencies and others to help them manage the health risks from environmental sources.

What are the main kinds of advice you have received from the Environmental Hazards Program?

On the whole, was this information timely and useful? Do you have specific examples of timeliness and utility you can share with us, whether positive or negative?

If Environmental Health Directorate did not provide this information and advice, where would you turn for information and advice? What would be the consequences if this were to happen?

7b. Do you have information or data you could share with us that might help illustrate how the Environmental Hazards Program might be contributing, however indirectly, to a reduction in human morbidity and mortality rates or to an increase in the quality of life of Canadians?

1.3 Methodology

Three methods of data collection were employed to obtain the views and opinions of a variety of clients and stakeholders on the above evaluation questions. These are:

- In-person (face-to-face and telephone) interviews
- A mail survey
- A workshop specifically on the topic of program indicators.

Included in this contract's terms of reference was a matrix which identified the evaluation questions that were to be addressed in each of the above data collection methods. This matrix was carefully scrutinized by the Program Evaluation Division and Environmental Health Directorate officials when developing the Terms of Reference and, with one exception, was used as given. The exception was to include Question 7b (availability of data to illustrate how the program might be contributing to program objectives) when interviewing non-federal government stakeholders.

Interviews

Interviews included federal officials outside Health Canada and non-federal clients and stakeholders. Interviews with Health Canada officials were conducted by Program Evaluation Division staff; while these interviews were not part of the research reported in this document, the two efforts were however coordinated.

Mail Survey

The mail survey was of individuals and organizations drawn from a master mailing list prepared by the Program Evaluation Division. The purpose of the mail survey was to provide information on evaluation questions #6 and #7a, as well as to provide some tombstone data on the respondent in which to place this information in context. The mail survey also provided the opportunity to gauge overall awareness of the Environmental Hazards Program and activities, and to identify and compare other sources of comparable information based on audience reach and ratings of usefulness and value.

The master mailing list was drawn from individual lists provided by the Radiation Protection Bureau, Chemical Hazards Bureau and Health Protection Branch. These lists were "cleaned" by the Program Evaluation Division. We sampled from this master list, using all of the RPB sample (20 names), 250 from the CHB list, and 720 from the HPB list.

Workshop

The purpose of the workshop was to further determine the existence of, or to suggest, acceptable indicators of the impact of the Environmental Hazards Program. Specifically, the desire was to investigate indicators of the impact of the program *as a whole*, and not just in relation to its ultimate objective (namely, a reduction in human morbidity and mortality).

The one-day workshop was held in Ottawa, April 4, 1995. In excess of 30 individuals, predominantly from within Health Canada but including others from outside the Department familiar with the subject of indicators, participated.

2.0 RESEARCH FINDINGS - INTERVIEWS WITH FEDERAL OFFICIALS OUTSIDE HEALTH CANADA AND WITH NON-FEDERAL STAKEHOLDERS

The list of interviewees, and the interview guide, are to be found in Appendix A.

2.1 Interviewee Profile

Mandate of Respondent's Organization in Relation to the Protection of Human Health and Safety from Environmental Hazards

Interviewees consisted of either those identified in the Program Evaluation Division's list of target interviewees or, in a number of instances, alternates to whom we were referred by the initial contact. Thirty-one interviews were conducted involving 48 individuals.[1] The sample was diverse, and included federal officials outside Health Canada and in a number of departments and agencies, and non-federal stakeholders (provincial governments, non-government organizations, and the private sector).

Interviewees' interests with respect to human health and safety were related to either chemical hazards (the majority) or radiation hazards. Involvement in the area of human health and safety and environmental hazards was in some instances specific (e.g., laboratory analysis related to the Great Lakes Laboratory for Fisheries and Aquatic Sciences, the Canadian Network of Toxicology Centres, and specific industry associations dealing with equally specific issues in the context of the Program) and in others broad (e.g., occupational health and safety professionals).

It is important to keep in mind that this was a qualitative, not quantitative research exercise. The diversity of interviewees, as well as the small number of eligible respondents in certain instances (e.g., individuals knowledgeable of the Radiation Emitting Devices Regulations and corresponding compliance and enforcement), was reflected in the responses provided to interview questions. Similarly, this diversity posed challenges when interpreting findings and attempting to derive conclusions.

General Awareness of the Environmental Health Directorate and Environmental Hazards Program

Awareness and knowledge of the Environmental Health Directorate (EHD) and the Environmental Hazards Program (EHP) ranged from limited to significant. Likewise, actual dealings with the Directorate ranged from minor (in some cases none) to significant. Awareness of the Directorate is considerably better than awareness of the Program; some individuals initially expressed no knowledge of the Program although, as it turned out, most were familiar with EHD and certain activities or individuals. Few can be said to have a comprehensive awareness of the Program which, given the extensive nature of EHP, should not be cause for undue concern.

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[1] Several interviews involved more than one individual. Input provided by the Federal/Provincial Committee on Environmental and Occupational Health included a written summation of the viewpoints of 10 members.

Linkages between programs are not always clearly understood. For example, an individual involved in or familiar with the Great Lakes Health Effects Program (GLHEP) may not necessarily realize the relationship between GLHEP and EHP. By the same token, when exploring awareness of certain publications, on several occasions interviewees were not aware that the publication in question is in fact produced by HC, let alone EHD.

Dealings with EHD are both formal and ad hoc. Formal dealings encompass interdepartmental committees (based on Memorandums of Understanding) and advisory committees involving external stakeholders. Frequent comment was made of the large number of such committees and the demands thus placed on individuals' time. Many stated that ad hoc dealings or communications (just "picking up the phone") are best, especially when time constraints and urgent issues must be confronted. These tend to be issue-specific situations.

While on this topic, it is important to note the unsolicited comments made by many interviewees regarding their dealings with particular individuals with EHD. On frequent occasions, mention was made of highly satisfactory dealings with the likes of Messrs. Hickman, Toft, Gilman, Raphael and others, and the professional respect in which these individuals are held.

Some organizations have a unique (one person referred to it as "exquisite") connection with the Directorate and Program; instead of "clients" they are "providers", carrying out research in collaboration with EHD (e.g., the Great Lakes Laboratory).

It is apparent from the research that any discussion of awareness of, and dealings with, EHD and EHP must take place in the context of the "proximity" of the individual to the Directorate and Program. Representatives of other federal government departments, and those colleagues or research partners in close and frequent contact are much more knowledgeable of the Program than are "clients" further removed, literally and figuratively. As will be seen throughout the presentation of findings, those individuals in closer proximity are more favourable in their assessment of the Program, its activities and its impacts.

2.2 Coordination of EHP Activities with Other Federal Departments and Agencies and the Provinces (Evaluation Issue #3)

Adequacy of Mechanisms

Generally, those interviewed feel that the activities and initiatives within federal departments and agencies and the provinces dealing with environmental hazards and human health and safety are moderately to well coordinated, and that mechanisms are in place to ensure cost-effectiveness and the avoidance of duplications and gaps in initiatives. (With respect to cost-effectiveness, one respondent indicated that this is a non-issue, provided the program is in fact needed.)

Perceptions on this issue however vary. Within other federal and provincial government departments, the perception is of very good or improved working relationships and of effective coordination of initiatives. While respondents acknowledge that this state of affairs may not have existed in years past, activities are now regarded as very much in sync. A recurring refrain was that the situation is "better now than before." Other comments included: "healthy, well-oiled mechanism;" "well operating relationships;" and "trust exists."

Provincial respondents reported that "coordination of activities with the provinces has been very good - - - (and that) the Directorate has been greatly cooperative when approached for information or assistance." Furthermore, it is believed that the EHD works well with the provinces in harmonizing legislation and in the preparation of guidelines.

Those individuals who are not in as close proximity to the federal government are less inclined to give the matter of coordination a favourable rating. As one individual pointed out, however, coordination has to be visible. And yet another stated that inasmuch as he was looking at the issue from the outside, he was not in a position to offer comment.

Numerous references were made to differences in mandates and focus between Environment Canada (EC) and Health Canada. HC's focus on human health and EC's on the environment, it is remarked, has affected relationships in the past, more so perhaps at the political level. The increasing acceptance of an ecosystem focus, and exercises such as the Priority Substances List (PSL), are felt to have brought the efforts of the two departments more in harmony with each other.

A distinction was made between relationships and coordination of activities at the staff or bureaucratic level, and those at the political level. Favourable comments were made in reference to efforts by staff or bureaucrats to coordinate initiatives (e.g., the PSL process) while most acknowledged that coordination at the political level is perhaps another matter.

Health Canada in general, and EHD in particular, are applauded for what interviewees, by and large, regard as an objective, science-based approach taken to risk assessment. "Credibility" was a word used often. The common perception is that EHD performs a science advisory as opposed to advocacy role. Isolated comments included "voice of reason" and "it puts health effects in the proper perspective and context." Talking of the strong scientific orientation, a couple of individuals remarked that this is "almost to a fault," but then added that this is to HC's credit and that if it did not maintain a science-based stance, it would be left open to manipulation.

Sufficiency of Input from Health Canada to Other Departments and Other Governments Regarding their Health Messages to the Public Concerning Health Risks Arising From Environmental Sources

Dissemination by HC of health messages to the public occurs in two ways: directly by means of publications such as The Sun, Your Baby and You, or indirectly by providing information to other departments or organizations which, in turn, communicate with the public.

Communication directly with the public and specific interest groups, as will be discussed later, is not without problems. Input from Health Canada to other departments and agencies, however, is generally seen as adequate (although few had an opinion on this matter). Health Canada scores well in the area of scientific and technical information for scientific/technical audiences, but not as well on information aimed at the general public. This observation points out a distinction in Health Canada's ability to communicate to these two fundamentally different audiences - the smaller, more select and knowledgeable audience versus the general public.

As noted, some clients "translate" HC messages and content to suit the needs of the ultimate audience (i.e., the general public). This highlights yet another distinction; namely, Health Canada's risk *assessment* communications versus the risk *management* communications of others.

2.3 Involvement in PSL Assessments (Evaluation Issue #4)

Extent of Involvement, Satisfaction with Process, and Expectations Regarding Future Assessments

The Canadian Environmental Protection Act (CEPA), and the Priority Substances List assessment process therein, are joint HC/EC responsibilities. The point of interest here is the involvement of stakeholders in this assessment process and, specifically, the front-end consultations with the Bureau of Chemical Hazards (BCH) which preceded the risk assessments and review of toxic substances, and the determination of control options. What was stakeholders' extent of involvement and their satisfaction with the process, and what are their expectations regarding future assessments - in the eyes of stakeholders themselves, as well as in the eyes of government representatives?

There are mixed feelings regarding the consultation process which took place in support of the PSL process. Some individuals were satisfied while others (perhaps the majority) were not. This dissatisfaction applies equally to those within government and to external stakeholders. Most individuals who were in any way involved in the consultation process remarked that there were problems with both the extent and timeliness of consultations. Consultations were minimal and often "late in the day." In certain instances, industry wanted more involvement, or disagreeing with the risk assessment methodology or results, wanted the opportunity to debate the issue and were frustrated when this did not happen. Some regarded the process as merely information gathering, not true consultation.

Stakeholder satisfaction with PSL consultations cannot be easily separated from their expectations of the impact of the toxic substance assessments and, specifically, future control strategies. EC representatives freely admit that the confidentiality and "heads up" manner in which PSL was conducted created problems. Both federal officials and stakeholders agree that lessons have been learned from the first round of PSL, and that PSL^2 needs to be more open and hopefully not characterized as a "black box."

Consultations aside, a number of individuals commended EHD for its science-based approach and for "sticking to their mandate." Adjectives such as "precise," "exact" and "credible" were used. Others were however critical of what they perceive as an unwillingness to enter into discussion and debate on issues regarding the assessments. Rigour in this instance was translated by one person as "straightjacket."

Some suggested that this is a reflection of mandate and culture, stating that EHD's role is to provide scientific advice and not to act as an advocate or to enter into political debate. Others suggested that constrained resources inhibit EHD officials from doing more; they attend to the demands of the day and then must move on to the next issue. They cannot afford, it is felt, to become embroiled in time-consuming debate over scientific advice and risk assessments.

Future challenges were noted, not only with respect to PSL^2, but also the new Canadian Environmental Assessment Act (CEAA). Under CEAA, there is a deadline for scientific response. This will put increased pressure on already limited resources; staff may have to drop what they are doing in order to respond to CEAA-driven requests.

2.4 Administration of Radiation Emitting Devices Act and Regulations (Evaluation Issue #5)

With respect to the Radiation Emitting Devices (RED) Act and Regulations, there were four issues: the effectiveness of administration; extent of compliance; problems, if any, with enforcement; and suggested changes to the Act and Regulations. Unfortunately, insight gained in this area is based on only a small handful of interviews, and even those with whom these subjects were discussed had varying degrees of involvement, thereby offering somewhat limited insight.

Compliance is not an issue, as more than one individual pointed out. Quite simply, it is in the interests of users to comply with regulations because of worker concern for radiation hazards, real or perceived, and because of "the intelligent understanding that we cannot have unregulated radioactive sources." As another suggested, compliance is the result of fear for health safety.

Because radiation protection is a matter of inherent concern, there is a need for information. Continued efforts, it is felt, are required to inform and educate target populations. More to the point, relevant information needs to get to the right people (a recommendation made in reference not only to radiation protection but also other EHP communications). A problem which arises in large medical institutions, for instance, is staff turnover.

Enforcement also appears not to be an issue. The Radiation Protection Bureau (RPB), which has jurisdiction over the sale and importation of radiation emitting devices and over federal and territorial facilities and operations, does not have a large monitoring program. Monitoring of operating equipment in all other instances is handled by provincial inspectors. RPB may become involved in some situations which are overlooked by other jurisdictions, or in which they have been asked to consult.

The provinces rely on federal legislation, safety standards and codes as the benchmarks for design and functioning criteria for radiation emitting equipment. Provincial respondents reported that, in their experience, the RPB is "readily available to respond to queries pertaining to radiation. Their expertise is frequently used."

The interviews provided no indication of a need for changes to the Act or Regulations. This may be a function of the limited number of individuals interviewed on this topic, or simply that there is nothing, as far as they are concerned, that needs to be fixed. Mention was made, however, of the need for ongoing attention to updating of codes and standards, and the provision of these updates to the right people.

2.5 Effectiveness of Communications with Specific Interest Groups and the Public (Evaluation Issue #6)

The general perception is that there are better communications, both formal and ad hoc, with certain federal departments and agencies, provincial governments and organizations with close working relationships (e.g. laboratories collaborating on research) than with interest groups external to the federal and provincial governments and further removed from the Program, or with the general public. Many believe that the general public may not be aware of the wealth of information and assistance available through the Program.

Some individuals felt that there are only minimal communications with external interest groups. In the words of one interviewee, "I do not think either Bureau (BCH or RPB) gets information out to the average Canadian." Another noted that "there is all kinds of information, but the Program does not satisfy the threshold of the average person for information." And as indicated earlier, EHP scores better on the communication of information of a more scientific and technical nature and to specific "internal" audiences.

Also noted earlier is that EHD provides information to other federal departments and agencies and other governments who, in turn, communicate with the public. An example is the Great Lakes Health Effects Program in which HC is a partner. The view is that it is GLHEP, and not HC, that deals with specific groups, and that GLHEP is increasingly reaching out to communities and the public. GLHEP was also given as an example of the more proactive approach which it is suggested EHD needs to take; i.e., to provide not only scientific advice, but also information on what the public can do.

A fundamental problem with EHP, many noted, is its dual objective and the challenge to produce information for both scientific/technical and general public audiences. These are two distinctly different audiences requiring different strategies and products. The source in both instances, however, are scientists, but "scientists do not know how to communicate effectively with the public." It is one thing to provide scientific advice on risk assessment, another to provide this information in a manner which the general public will understand. Publications for the public, one individual remarked, "need to be more user friendly."

One provincial representative, commenting on the invaluable support provided by EHD to other agencies, questioned whether it should also attempt to excel as a front-line communicator with the general public. Commenting on the low profile which the mail survey indicates the Environmental Hazards Program has in the general public domain, another individual responded by questioning whether or not a high-profile program should in fact be a priority "since the program generally functions as support to other federal and provincial agencies who take the lead role."

2.6 Protection of the Health and Safety of Canadians (Evaluation Issue #7)

Manner and Extent by which EHP has Achieved its Objective

To most interviewees, the leadership and support of Health Canada provided through the Environmental Hazards Program has contributed significantly, directly or indirectly, to the protection of the health and safety of Canadians from environmental hazards. This has been achieved either through regulations and guidelines, the impetus for which is based on considerations of hazards to human health (examples include radiation dosages, drinking water quality, and pesticides approval) or behaviour change resulting from informational and educational initiatives.

The extent of EHP's contribution to health and safety as a result of behaviour change cannot be gauged in terms of individual program activities or products, or even the sum total of all activities. The suggestion was made that an assessment of EHP's contribution should not be made in isolation, but with an eye to the value-added effect of the Program. Changes in behaviour are the product of multiple initiatives, EHP and others, dealing with human health and the environment.

The provincial perspective is that "the Ottawa-based federal Program is most effective when it works in partnership with provincial programs since provincial agencies usually operate as the first line of response."

Kinds of Advice Received from EHP

The interviews indicated that different people receive, solicited or unsolicited, different information and in different forms. There is no common picture.

Awareness of EHP publications varies. Unprompted, awareness was minimal to at best moderate. Awareness was significantly better when prompted, although interviewees only recall certain publications. Given the array of publications available and the diversity of interviewees, this range in awareness is perhaps to be expected. Similarly, it is difficult to say if certain publications received more frequent mention than others; all were recalled at one time or another.

On several occasions, the suggestion was made that a list of publications and information should be made available. It subsequently became known that a list may in fact exist. If this is so, the significant fact is that its existence is not known and has not been communicated to those who need it.

For all but the internal audience comprised of individuals in other government departments and agencies in close proximity to HC, the basic problem is one of "connection"; many may not know the existence of information or who to ask for such information. In contrast, the internal audience knows what exists and who to contact. The remedy, it was suggested, is to reach out to communities and publics rather than simply traditional health professionals; but this, it was added, is not what scientists do well. It was also suggested that EHP needs to package information better for decision-makers and policy types in local groups and communities.

Timeliness and Usefulness of Information

Information, both advice and published materials, is by and large viewed as timely and useful (albeit, in the opinion of some, somewhat technical at times). Timeliness of course depends on the urgency of the issue in question and the corresponding expectations of the recipient; however, the general feeling is that if the situation is urgent, the information required is provided in a timely fashion. However, as one individual stated, good science takes time. Another individual commented that their organization had requested information from EHD but that it was a long time coming; they have not bothered going back to EHD.

One person made the observation that EHD is quick to issue advisories, but slow to cancel these advisories when this is appropriate. In the same vein, another commented that while EHD is good at issuing advisories, it is not as good at following up with information that shows those who are affected what to do.

Alternative Sources of Comparable Information

Interviewees' opinions were mixed as to the existence of alternative sources for EHD-type information, and whether or not they could do without the information provided by HC.

For many, there is no source of expertise or information comparable to, or which could replace, that provided by EHD. They regard EHD as having a human health focus which does not exist elsewhere and that is unique to Canada because of our social health care system. Generally speaking, these opinions are once again held by those in other federal government departments and agencies, provincial governments and organizations working in collaboration with EHD. As one provincial representative remarked, it is a valuable national service and support to the provinces. The same individual also noted that one has to have the capacity and knowledge to use the expertise available from EHD.

Others believe they have alternative sources of information on human health and environmental hazards issues; provincial ministries, health care institutions, Environment Canada, and international agencies were mentioned. In certain instances, individuals said that they have no dealings with EHD, that they obtain the information they require elsewhere, and that they would not be bothered if the Program ceased to exist. In many instances, however, one is left wondering if, unbeknownst to them, the information which they state they can acquire elsewhere in fact has its origins in HC.

Indicators of EHP's Impact

Opinions regarding EHP's contribution to human health and safety from environmental hazards are one thing, while the identification of viable indicators which would substantiate this impact is yet another. Most interviewees felt that it is extremely difficult (some feel impossible) to derive indicators of the ultimate objective and desired impact; i.e., a reduction in human morbidity and mortality as a result of program activities. In the words of one individual, you will "tie yourself in knots trying to do it."

Respondents commented on the distance and time, from the initiation of protection activities on the one hand, to the point at which the anticipated response might be measured, and also on the many confounding variables which may come into play in between. Examples mentioned included: the phase down of lead in gasoline, and the measurement of blood lead levels and neurotoxic effects; and education regarding the effects of UV rays and the incidence of skin cancers.

Some individuals noted that there are data bases in Canada which could be used to shed light, if not on the EHP itself, then on the impact of environmental factors on health in general; examples mentioned included the Canadian Mortality Data base, the Canadian Cancer Registry and the Hospital Medical Record Information (HMRI) system.

Those who believe that there are program indicators, or that indicators could be developed, tend to think in terms of "softer" measurements of impact. Suggestions included: levels of public awareness on specific issues; the number of relevant publications distributed; purchase of a given product such as sunscreen, etc. It can be argued, however, that these are indirect and rather deductive in nature.

As one individual pointed out, viable and acceptable indicators are premised on agreed upon and measurable program objectives. Generating indicators of program impact solely in relation to a reduction in quantitative terms of human morbidity and mortality may indeed not be feasible. Setting objectives which lend themselves to qualitative if not quantitative measurement of EHP's expected results may be more appropriate.

There appears to be significant activity in the area of health and/or environment indicators. The Bureau of Chemical Hazards is reported to be planning a session on this topic, and the International Joint Commission is apparently investigating indicators with respect to the Great Lakes. EC's State of the Environment Directorate continues to pursue development of indicators and are said to be looking at the incorporation of human health factors.

2.7 Summary of Findings and Conclusions

Proximity

Given the expansive nature of the program and the range of evaluation issues, combined with the relatively small yet diverse interviewee sample, the interpretation of findings and derivation of conclusions is challenging.

There is a strong correlation throughout the research findings between what may be referred to as the "proximity" to EHD of other federal government departments and agencies, other governments, and certain organizations (i.e., those with close working relationships and collaborative efforts) and awareness of the Directorate and the Environmental Hazards Program and the favour with which both are looked upon. Conversely, those not in close proximity are more inclined to question the extent of coordination of activities, effectiveness of communications, indispensability of EHP information, program contribution, and so forth.

Coordination

Coordination of activities with other federal government departments and agencies and the provinces is judged to be working well. PSL and the demands it created appear to have been somewhat of an indoctrination in cooperative efforts for Health Canada and Environment Canada staff.

Ad hoc communications are preferred and work well. Excellent contacts exist with Directorate staff, and certain individuals are held in high regard.

EHD is generally applauded for its science-based approach to risk assessment. It is also viewed as very credible, due in large part to the maintenance of a scientific advice versus advocacy stance.

PSL Assessments

There is some dissatisfaction all around (i.e., both government and non-government players) with the front-end consultation process. Lessons have apparently been learned and expectations are that the process in PSL^2 will change. Stakeholders want less of a "black box" approach and of the "heads up" surprises which characterized PSL's first phase.

Radiation Emitting Devices Act and Regulations

Neither compliance nor enforcement appear to be issues. Other than the wish that attention be paid to updating codes and standards, and that these be distributed to the right people, no changes to either the Act or Regulations were identified.

Effectiveness of Communications

Two de facto program strategies - the provision of scientific advice to a set of "internal" clients, and outreach communications to the general public - present a conundrum. It is generally accepted that EHD does a far better job in the former than in the latter. The problem is that the same strategy (and the same communications objectives, messages, content and style, etc.) naturally does not work equally well for both target audiences.

Neither the Directorate nor the Program have much profile in the public domain. This finding raises a fundamental question which was not explored; namely, how does EHD in fact wish to position the Program, and what are the corresponding communications objectives and strategies?

Protection of Health and Safety of Canadians

Clients rate EHD advice and information as timely and useful and feel that there is no alternative to what is considered to be a valuable and essential national service and support.

The Directorate and the Program are believed to be making a significant contribution to the protection of the health and safety of Canadians from environmental hazards. This contribution, however, must be viewed in the context of the EHP in combination with other initiatives; i.e., not in isolation, but as value-added.

The development of indicators will be difficult and may require revisiting EHP program outputs and expected results to see how these could be refashioned so that they lend themselves to quantitative measurement or qualitative assessment.

3.0 RESEARCH FINDINGS - MAIL SURVEY

As part of the Environmental Hazards Program Evaluation, a mail survey was conducted of people who had at some point contacted either the Chemical Hazards or Radiation Protection Bureaux, or the Health Protection Branch for advice or information provided by the Program. The mail survey was chiefly concerned with issues regarding awareness, use and perceived quality of communications carried out by the EHP.

3.1 Methodology

The mail survey sampling was carried out as follows:

- Twenty names were provided by the RPB. All these contacts were mailed a survey.
- A total of 667 names were on the CHB list. We randomly sampled 250 names from this group, representing a sampling rate of roughly one in 2.7.
- A total of 5,273 names were in the list provided by the HPB. We randomly sampled 720 names from this list, for a sampling rate of roughly one in 7.3.

Potential respondents were in a variety of countries. Most were in Canada, but a significant number were in the U.S. (266 in the complete database before sampling), and in about three dozen other countries as well. All countries were sampled equally.

There were also names that had been listed (or revised) at various times in the database, from 1989 to the present. Again, all were sampled randomly.

All respondents were mailed a survey in English (see Appendix B), a cover letter from Health Canada, and a postage-paid (in Canada) return envelope. Respondents in Quebec and New Brunswick were also provided with a French-language survey instrument. Roughly two weeks later, all respondents were mailed a reminder and another survey instrument and return envelope.

The respondents in the RPB database were "must contact" individuals. In order to increase the response rate from this group, after about a four-week period all non-respondents were contacted by telephone and encouraged to complete the survey; where necessary, they were faxed another survey form. (The initial response rate from this group was very low - 5% before the telephone follow-up; it subsequently rose to 50%. However, no one contacted by telephone indicated this was due to any particular reason beyond the usual disinclination to fill out surveys.)

The final response rates were:

RPB:	10 responses (50% response rate)
CHB:	96 responses (38%)
HPB:	213 responses (30%)
Overall:	319 responses (32%)

Because of the small number of respondents in the RPB group, the RPB and CHB groups are combined for presentation purposes in the remainder of this report.

3.2 Survey Results

Presentation and Analysis

The survey data tables are to be found in Appendix B. Results are presented as follows:

- The bulk of the analyses are presented by "source" in all exhibits numbered "x.1" (e.g. Exhibit 9.1) This notes whether the respondent's name was on the list provided by the RPB, the CHB, or the HPB. However, in some cases it would require a very large number of exhibits to fully present the data; as a result, for certain survey questions we have only provided summary tables for respondents overall. In these cases, however, we have also noted our "eyeball" impressions of the differences by source in the text.

  The reader should note that these data include the responses of many people who do not have a great interest in environmental health areas, since the database lists include people who have had only very casual contact with Health Canada. Accordingly, we have also presented results for two sub-sets of respondents noted below.

- One sub-set is for "interested" respondents who indicated high interest in the chemical health hazards health area. These exhibits are numbered "x.2". The total N for this sub-set was 160:

RPB and CHB:	78
HPB:	82

- The second sub-set is for those with a similar high interest in the radiation-emitting devices health area, found in exhibits numbered "x.3". The N for this sub-set was 64:

RPB and CHB:	26
HPB:	38

These two sub-groups were identified through their response to question 2 on the survey.

- We attempted another variant of the sub-group analysis to see if we could separate out "interested, knowledgeable" respondents for whom the EHP would be particularly important, in effect trying to get around the problem of the general nature of the mailing list database. In this analysis, we used only the respondents who indicated both high interest in the chemical hazards health area (survey question 2), and said they were very well informed about those hazards (survey question 3); there were 69 people in this sub-group. A similar analysis was done for the 21 respondents with both high interest and knowledge about radiation hazards. However, comparison of these results with those for the two sub-groups noted immediately above usually did not indicate any significant differences. Where small differences existed, they were normally in the direction of the EHP being slightly less valuable, useful, and so forth to this "interested, knowledgeable" chemical hazards sub-group than they were to the corresponding merely "interested" sub-group. The radiation hazards "interested, knowledgeable" sub-group was more varied, rating the EHP slightly better than the merely "interested" group on some measures, and worse on others. Overall, the pattern of results was not convincingly different from the other analyses, and are not presented in this report.

- Finally, we analyzed some key questions by six types of respondents' organization as shown in exhibits "x.4". For this, we collapsed some categories found in the question 1 on the survey. Again, these analyses are very lengthy to present; for example, to fully present the data to question 4 by type of organization requires at least six tables, one per organization type. For this analysis, we usually just note in the text where our "eyeball" scan of the analyses indicates effects by organization type, unless it was easy to present a table.

The different analyses are indicated in the headers found on each exhibit. **Note that not all question results have been presented in all four ways.** A review of the analyses indicates that there are sometimes differences in responses depending on the mailing list source and on the respondent's organization. However, the analyses done for the two "high interest" sub-groups are virtually identical to those for respondents overall. **Thus any apparent problems found by respondents with EHP communications cannot be**

laid simply at the door of respondent interest or disinterest with the nature of the information.

Open-ended comments were also analyzed. To provide the most meaningful data, we confined this analysis to the comments of respondents who indicated a high interest in either the chemical hazards health area, the radiation-emitting devices health area, or both (this was about 59% of all respondents, as indicated by survey question 2).

Before discussing the survey results, we should note that we received a number of calls from people who said they simply did not know anything about the EHP. Similarly, we received quite a few surveys were returned uncompleted for the same reason. The results shown in this report are only for respondents who provided at least some data other than "don't know" responses.

Background Data

Note that Exhibit 2.1 indicates that respondents can be roughly grouped as follows:

	N	% of total
· Industry and industry associations	90	28
· Health care institutions and organizations	97	30
· Public information (educational institutions, libraries, media)	49	15
· Government (all levels)	47	15
· Research institutions	6	2
· Other (private citizen, public interest/advocacy, consumer organization, other)	30	9

(One respondent did not provide us with data on this issue.)

This categorization will be used below in any results that refer to the type of the respondents' organization.

Exhibits 3.1 and 4.1 show that the general level of interest in chemical or radiation hazards health areas among respondents is fairly high no matter what the source of the mailing list (RPB, CHB, or HPB). A detailed analysis revealed that, as expected, respondents from the RPB list are mainly interested in radiation-emitting devices; those from the CHB list, mainly chemical hazards. Overall, about 59% of respondents noted that they had a high level of interest in chemical hazards, radiation hazards, or both. This indicates that the EHP is generally reaching an interested audience (though not necessarily the person within a given organization who could make the best use of the

EHP information). Note further that Exhibits 3.4 and 4.4 show that there is some small difference in the types of organizations most interested in chemical hazards (government, industry, and health care) versus those most interested in radiation hazards (health care and the "public"). (Any data pertaining to research organizations must be interpreted with caution as the number of respondents was only 6.)

Awareness of Environmental Hazards and the EHP

Exhibits 5.1 and 6.1 indicate that:

- Respondents consider themselves to be moderately well-informed in general about environmental hazards. As expected, the RPB/CHB group is particularly well-informed about environmental hazards; as well, there is a general tendency for all groups to know more about chemical hazards than radiation hazards.

- Exhibits 5.2 and 6.3 show that the "high interest groups" are also more likely to consider themselves well-informed.

- Exhibits 5.4 and 6.4 show that there are some differences in levels of awareness by type of organization. Exhibit 5.4 demonstrates that research groups, government, and industry are more well-informed about chemical hazards. It is interesting that the level of informed awareness about chemical hazards expressed by health care organizations is not higher; however, other variables (e.g., criteria by which they judge awareness) may come into play.

  Exhibit 6.4 does not show much effect by type of organization regarding knowledge of radiation-emitting devices except for research institutions being most well-informed. Again, one might expect health care workers to be better informed than they are.

Exhibits 7.1 and 8.1 demonstrate that:

- There is only moderate awareness about EHP activities, and of some activities, little awareness. Note that over a third of the respondents overall checked no "activity awareness" whatsoever with respect to chemical hazards, and over 40% did so for radiation hazards. (see the footnotes in Exhibits 7.1 and 8.1, respectively). Many activity categories showed that only about half or fewer of the respondents were aware of them. (This is not necessarily bad, of course, if the right people are aware of the appropriate activities.)

- Even awareness of EHP activities by those respondents with high interest in chemical and radiation hazards health areas (see Exhibits 7.2 and 8.3) does not change noticeably. Note that many of these respondents checked off none of the activity categories at all.

  Analysis of the open-ended comments provided by respondents with high interest in either chemical or radiation hazards also indicates a low level of awareness of the EHP and its activities. Between about half and two-thirds of the comments made (depending on the survey question; respondents commented on this in several places) were to the effect that the respondent knew little or nothing about the EHP or its publications. Many people did indicate, however, that they thought the EHP was working in areas relevant to their organization and would like more information about the program.

- Awareness of instrumentation development is noticeably lower than other activities.

Exhibits 9.1 and 10.1 show that:

- The EHP is not, overall, a tremendously important source of information for respondents on either chemical or radiation hazards. However, this must be taken in the context of the many "competing" sources of information available (see Exhibit 20.1), as well as the relatively high number of respondents indicating "don't know".

- Notwithstanding our caveat above, the rather high proportion of respondents in the RPB/CHB group indicating EHP information is "not at all important" is perhaps surprising, as are the similar findings in Exhibits 9.2 and 10.3 for the sub-groups with high interest in these health areas.

- The analysis by organization type found in Exhibits 9.4 and 10.4 indicates that the EHP is essentially equal in importance as an information source for almost all types. The exception is research institutions, for which the EHP is notably less important (but again, the number of respondents is very small).

Use of EHP Communications

Some specific EHP communications products were asked about; the results are shown in Exhibit 11.1. Relatively few respondents in any source group were aware of (or had seen) any particular product. "Issues bulletins" received the highest percentage of mentions. Note that over one-third overall had not heard of or seen any of them. (See the footnote to the exhibit.) Note also that - according to our survey results - slightly more respondents have seen some of these products than are aware of them! Some respondents clearly did not quite understand the question and answered it incorrectly; we would suggest that the higher figure in any category is probably the correct one.

Actual use of EHP information is found in Exhibits 12.1 and 13.1. Some points of interest are:

- A large proportion of respondents (over half for chemical hazards and two-thirds for radiation hazards for respondents overall) indicated they had not used any of the various EHP information types. (Again, not everyone needs to.) However, this may point to some inefficiency in information distribution; for example, there may be some distribution to people who do not really need the information.

  A more serious interpretation would be that the right people are not getting the right information, but this possibility cannot be confirmed by the survey results. Very few persons made open-ended comments indicating that the EHP information was not going to the correct person in their organization. However, not enough comments of this type were made to substantiate a conclusion in this regard.

- Note that there is only slightly more use of information by those with high interest in these health areas (Exhibits 12.2 and 13.3) versus respondents in general (Exhibits 12.1 and 13.1).

- There is no one type of information that is commonly used. General public information on both chemical and radiation hazards is the popularity "winner" for respondents overall, with guidelines for safe exposure being almost equal in usage.

Usefulness of the Communications

Exhibits 14.1 through 14.4 show that:

- EHP communications were judged moderately useful to respondents. No one type of communication is strikingly more useful than others, although "analysis of health risks", "providing advice", "publishing information" and "guidelines" rated slightly better. A high number simply responded "don't know".

- A scan by respondents' source did not reveal any striking pattern of differences.

- Analysis by organization type shown in Exhibit 14.4 indicates that the information was essentially equal in usefulness for all types, with some slight exceptions. Research institutions - contrary to the results discussed regarding the overall importance of EHP's information role (Exhibits 9.1 and 10.1) - appear the most likely to find EHP information useful. This is true in almost all categories of information shown in the exhibit. The researchers appear to be carefully distinguishing between "importance" and "usefulness". However, only six respondents are represented, so the results should be interpreted with care.

Exhibit 15.1 through 15.4 show how the EHP information was used. Note that:

- The data overall show low to moderate usefulness for those who actually used the EHP material. For instance, of general respondents with an opinion (i.e., excluding the "don't knows"), about 24% said it was very useful as a source of general information or as a reference document, and 49% said it was fairly useful.

- However, many respondents don't know how useful it was or judged it to be not very useful, and the usefulness in categories other than as a source of general information or as a reference document is lower. For example, of respondents with an opinion, about 50% did not find the EHP information very useful as a basis for developing regulations or policies. (This must be considered, however, in the context of how many respondents need it for this purpose.)

- Government organizations were the ones most likely to find it useful for general information and reference, and slightly more than others as the basis for decision making; see Exhibit 15.4.

Analysis of the open-ended comments made in response to survey question 10 (which asked for specific examples of health and safety benefits associated with use of the EHP information) indicated that there was a very wide variety of uses. Very few respondents provided any degree of detail on these uses, and many simply said that specific examples were difficult to identify. Overall, however, uses reported could be generally categorized as those internal to the respondents' organizations, and to clients of those organizations. For example, internal uses included:

- A company used the regulations to help set company safety standards; another used EHP data to ensure they complied with regulations and guidelines in the workplace.

- A government organization investigated radon exposure in Canadian cities, and developed mitigation and exposure reduction methods (unspecified) as a result.

- A firm developed ways to remove lead-based paints, and developed Canadian products (unspecified) as a result.

- Government bodies developed health advisories regarding "country food" (food gathered from the wilds), sun exposure and protection, and so forth.

- Information on pesticide degradation was found useful from the Environmental Protection Toxic Chemicals and Waste Management Bureau (we are uncertain whether this information was in fact provided by the EHP).

- Company employees were made aware of (unspecified) chemical hazards and appropriate safety gear.

- An organization circulated the publication The Sun, Your Baby, and You to staff, and received favourable comments.

- Organizations without internal research capabilities commented on the need for external research of this type.

- A government agency used information regarding appropriate disposal of mercury spills.

- An Environmental Advisory Group to a city council used EHP data to advise on the likely low-level radon emissions from a proposed landfill; and also on the epidemiology of bioremediation.

- A company identified likely safety-related equipment problems.

- The Issues Bulletins were used by a group wishing to make a submission regarding generic pharmaceuticals; it was noted that a specific EHP staff member was "very, very useful and helpful."

There were many other examples of this kind of internal use. External uses generally were in terms of providing information to the organizations' clients. For example, a law firm provided advice (unspecified) to its clients based partially on EHP information, as did a free-lance dietitian. The most common external use was through the provision of various kinds of advice and information to the stakeholders of various government agencies.

Exhibits 16.1 through 16.4 discuss the quality of EHP communications:

- Overall, the quality is perceived to be moderately good by those with an opinion. Taking out the "don't know" responses in Exhibit 16.1, for example, results in about 17% of respondents finding it very good in overall quality, while 60% rate this factor as fairly good. (Of course, this leaves almost a quarter of respondents rating it as not very good.)

- The most significant problem area would appear to be that 47% of respondents voicing an opinion said that EHP's use of appropriate media was not very good. (In one open-ended comment, the respondent said more use should be made of means such as electronic bulletin boards and 1-800 information numbers.)

- By source list, there were no apparent big differences among the three groups, except that the level of technical detail was more likely to be rated as poor by the respondents from the RPB (50% of those voicing an opinion) and CHB (36%) than those from the more general HPB group (20%). This might indicate some lack of technical detail for the "expert" readers.

- Respondents from research organizations were most likely to approve of the quality with respect to the measures shown in Exhibit 16.4 (again, note this only represents six respondents, and also depends on the specific communications products they are thinking of).

Exhibit 17.1 indicates that very few respondents have been involved in consultations with the EHP. Of those who have, the "technical quality" (organization, background material, and feedback notes) appears to have been satisfactory. The willingness of EHP to sincerely listen to and address respondents' concerns was perceived as somewhat less so.

Alternatives

The information provided by the EHP is believed to be alternately available in many ways from a variety of other sources. Exhibits 18.1 through 18.4 illustrate that the respondent's own organization is seen as the most useful source of "competing" information. Following that, there is a group of sources all a bit lower but roughly equal in usefulness: industry, other government agencies, and health care providers. (In all instances, we are left wondering what was the original source of the information in question.) Other sources are judged somewhat less useful by respondents overall. There were no great differences depending on the mailing list source, except that health care organizations were more likely to be used as an alternative source by respondents from the HPB (more general public?) group.

If the EHP did not provide any information or advice, then:

- Most respondents (about 58% of those with an opinion) would not feel much impact, while most of the remainder (about 33% of those with an opinion) would experience a moderately negative impact, as demonstrated in Exhibit 19.1.
- Exhibits 19.2 and 19.3 do not demonstrate significantly greater perceived degrees of impact for respondents with high levels of interest in these health areas.
- Exhibit 19.4 shows that respondents in government organizations would suffer somewhat more than others, while those in research agencies would suffer the least (perhaps, it might be speculated, because they generate their own research data and information), with little difference in impacts among other types of organization.
- Exhibit 20.1 shows that most respondents would search for alternative information from other government agencies. Following that, there is a group of alternative sources consisting of the respondent's own organization, industry sources, and health care sources; each was roughly equal in importance. Other alternative sources are of lesser value.

The analysis of open-ended comments provided in survey questions 15 and 16 was not particularly illuminating. By far the most common response to question 15 as to the relative usefulness of EHP information compared to that from other sources was that the respondent had never received anything from the EHP! (About a quarter of the respondents noted this fact, and this represented about half of the comments made. It also raises the question as to why these individuals were on the mailing lists.) Of the remaining comments, about half indicated that the EHP did provide some value-added compared to information and advice from other sources, while the other half indicated the opposite. Positive comments, in roughly descending frequency of mention, included:

- The information is not easily available from other sources.

- The EHP information is more credible and backed by scientific inquiry than that from industry or some other governments.

- Health Canada has more of a public health interest than other Canadian federal departments providing similar data.

- The EHP information is Canadian-specific and timely.

Negative or neutral comments (all of roughly equal frequency) included:

- The respondents get the information required from other Canadian sources such as provincial ministries, Industry Canada, Environment Canada, the Atomic Energy Control Board, equipment manufacturers, and industry associations. (Again, we do not know the specific information in question or its original source.)

- Equivalent data is available from the U.S. or Europe.

- The EHP does not provide enough scientific detail.

- All data sources are equally useful.

Note that none of the respondents really provided a great deal of detail as to how the EHP information was better, or worse, than that from "the competition".

The analysis of open-ended survey question 16 regarding the impact if the EHP stopped providing information and advice was even less helpful. First, almost no one provided any information at all. Those who responded usually simply noted that they were mainly affected by regulations developed by agencies other than Health Canada, so the EHP data was interesting but not critical.

Summary Comments and Recommendations Made by Respondents

Finally, some respondents provided summary comments in open-ended survey question 18. Again, by far the most common response (representing almost two-thirds of the comments, and made by about one-third of the respondents overall) was that the respondent knew little or nothing about the EHP and its publications. Many did, however, express interest in finding out more about the program.

The next most common remark made in this question is that respondents suggested that the EHP should do more promotion of its work and improve the availability of its publications (roughly 20% of those providing comments suggested something along these lines). The remaining comments were individualistic, including those such as:

- More stakeholder input is required.
- The reports are too long and technical.
- The EHP should ensure the right persons in the organizations are getting the material.

3.3 Summary of Findings and Conclusions

Sample Limitations

It is speculated that there are indeed audiences for whom the EHP information is useful; however, these cannot be easily identified through a rather general mail survey and a sample based as it was on the mailing lists provided. Nor are there any known benchmarks against which to compare survey measures. This is not to criticize the methodology, but merely to point out its practical limitations. Only with a significantly larger and more costly research effort would it be possible to identify the true population for whom EHP information is really useful.

Awareness and Usefulness of the EHP

The results overall point to EHP's communications efforts being of low to moderate usefulness to respondents in general. In particular, there is only moderate awareness of the EHP and its activities or communications products among our survey samples, and correspondingly little use of many EHP information products and services. However, when the products and services were actually used, they appeared to be moderately useful, and a modest proportion of communications were very useful. Furthermore, many people thought EHP was working in areas relevant to their organization and would like more information about the program.

Why communications were judged useful spanned a large variety of reasons. In the private sector, reasons included ensuring worker safety and safety compliance and enabling the company to provide goods and services in the environmental health areas. Some of this appeared to be through use of "general interest" EHP information, while some seemed to be through very specific uses; however, most respondents did not provide enough detail to tell for sure. For government agencies and health care organizations, the EHP data were often used to provide information and advice for themselves and for clients. In both cases, some of the information used appeared to be of a "general interest" nature, and some very subject or issue specific. A very few mentioned specific communications products that they had used (e.g., the Guidelines for Canadian Drinking Water Quality; and information on pesticides from the Environmental Protection Toxic Chemicals and Waste Management Bureau), but the respondents are unsure whether the EHP was involved in producing them.

There were no responses provided that were specific enough to allow examples of explicit health and/or safety improvements to be cited.

A significant amount of EHP's communications is judged not very useful, even for respondents with a high level of interest in specific environmental health areas. The reasons for this are not known, and the analysis of the open-ended comments was not particularly enlightening. The technical quality of the communications seems to be reasonably good, although with room for improvement, perhaps especially for technical experts.

Impact of Eliminating the EHP

Eliminating the EHP as a source of information and advice would not affect most of the general respondents. Among those with a strong interest in chemical and radiation hazards, however, roughly equal numbers would experience little impact, or would feel a moderately negative effect. Very few respondents would not bother trying to replace the lost information. On the other hand, equally few believe they couldn't replace it. In the open-ended comments, respondents were also split roughly in half, with some indicating that EHP communications provided a certain degree of value added, and some saying comparable information was easily available elsewhere.

To the extent that the EHP communications have a small impact on some of the survey measures, this may well be due to the general nature of the contact names in Health Canada's database: we may not have sampled many people for whom this information is critical. However, this is a difficult notion to test with our survey data.

General conclusions which can be drawn from the mail survey data are:

1. EHP communications appear to be going mainly to people with relatively high interest in the relevant environmental health areas. This is particularly true for respondents in the areas of government, industry, health care, and research. There is, however, some indication of inefficiency in distribution: the most important people may not always be reached, and some of the people reached have only a passing interest in the EHP products.

2. If one assumes that the mailing lists provided represent people who would truly get value from its publications, then there is clearly room for improvement in the manner in which the EHP informs its audiences about its activities and products, and distributes this information and these products.

3. The quality of the communications products appears generally sound. However, there is some reason to think that some improvements could be made. These improvements should be made on a strategic basis, as some respondents indicated the EHP material was too technical, others that is was not technical enough. This could indicate that it is either "just right", or that it is not differentiated enough for different audiences.

4. Our primary impression is that there are no clear distinguishing features which make the EHP activities and communications products different from, or better than, those of other organizations. In services and social marketing terms, this is referred to as perceptual positioning. The open-ended comments were the most illuminating on this score - but because of what they did **not** say, not what they did! The scarcity and lack of detail in these comments is, in our experience, quite unusual: in other evaluations, many respondents who comment on programs they find useful go to considerable lengths praising the uniqueness, value, and importance of the programs' benefits. Often they attach separate pages extolling the program's virtues. Virtually no one did so here.

   Ideally, the EHP should provide products and services that are in some way unique; for example, a uniquely Canadian focus and interpretation; the most timely information through electronic means; the best personal servicing of requests; the integration of research and information activities of all relevant Canadian agencies; and so forth. Without such a unique focus, the EHP runs the danger of providing information that is only "nice to have", but not essential.

4.0 INDICATORS WORKSHOP

4.1 Purpose of Workshop

The purpose of the workshop was to determine the existence of, or to suggest, acceptable indicators of the impact of the Environmental Hazards Program. Prior to the workshop, and based on interviews within and outside Health Canada, it was anticipated that there would be difficulty in identifying indicators of the EHP's impact on the ultimate objective (i.e., a reduction in morbidity and mortality). Consequently, it was emphasized from the outset of the workshop that the desire was to investigate indicators of the impact of the program *as a whole*, and not just in relation to its ultimate objective. (A copy of the EHP program logic chart is to be found at the end of this section.)

Before reviewing the workshop findings, it is worthwhile to recall certain elements of this study's evaluation questions (see Section 1.2 for the full list of evaluation questions). The elements we have in mind provide a degree of latitude which is particularly appropriate in light of the workshop findings.

The questions (in abbreviated form) are:

> 6. How effectively does the EHP *communicate with specific interest groups and with the public* about actual exposure to radiation and chemical hazards, and known health risks from such exposure?
>
> 7a. *How timely and useful* is the data and information provided by EHD, and what would be the consequences if it was not available?
>
> 7b. Is there data or information that might illustrate how EHP is contributing, *however indirectly*, to a reduction in human morbidity and mortality rates, or to an increase in the quality of life of Canadians?

4.2 Format

The one-day workshop was held in Ottawa, April 4, 1995. In excess of 30 individuals, predominantly from within Health Canada, but including others from outside the Department familiar with indicators, participated. (A list of participants is provided in Appendix C.)

The basic format consisted of an opening plenary session, followed by smaller working group sessions, and then a closing plenary to review the working groups' findings. During the opening plenary, two presentations were made. The first was a brief overview of some theoretical considerations regarding indicators; quite simply, this was designed to pose questions rather than provide answers. The second was a synopsis of a paper by Michael Holliday entitled *Musings on Health and Environment Indicators* which had been provided to participants prior to the workshop. (A copy of this paper is contained in Appendix C.) Also provided in advance of the workshop were summaries of findings related to indicators from interviews conducted by Program Evaluation Division staff with officials within Health Canada, and interviews conducted by Resource Futures International with federal officials outside Health Canada and with non-federal stakeholders.

Four discussion topics were presented to workshop participants which, it was suggested, should be the focus of deliberations in smaller working groups; these topics were:

- Setting measurable (and acceptable) objectives
- Confirming existing indicators
- Filling the gaps with new indicators
- Providing the necessary data and information to support these indicators

In a situation such as that which is described above, a one-day workshop format lends itself to generating ideas. Conversely, in the time available, it is almost impossible to reach consensus on contentious issues or build a strong argument on given topics. The indicators workshop bore out this truism.

4.3 Fundamental Issues for Discussion

The plenary presentations served to highlight certain fundamental issues which participants were inclined to first address. These fundamental issues were:

- What is the *purpose* of indicators; i.e., why do we need them?

- *Who* are the indicators for?

- What *type* of indicators are required, or feasible?

- What is an acceptable basis of *measurement* in support of any given indicator?

- How do we *implement* or "sell" whatever approach to EHP indicators is chosen?

4.4 Findings

The following is a synopsis of discussions which took place during both the plenary and individual working group sessions. Presentations made by the individual working groups to the closing plenary are provided in Appendix C.

The need for indicators

To reiterate, the purpose of the workshop was to determine the existence of, or suggest, acceptable indicators of the EHP's impact. These indicators are required as part of the evaluation of the EHP.

Some degree of confusion existed in terms of the distinction (and the need to distinguish) between indicators of EHP's overall impact on the one hand (i.e., taking into account all elements of the program) and specific indicators of the health effects of the program on the other. Nonetheless, problems encountered with providing direct indicators of the program's ability to achieve its ultimate objective (namely, a reduction of human morbidity and mortality) were soon acknowledged, and attention turned to other, less direct indicators of program impact.

It was also acknowledged that while it is customary to have program indicators for the purposes of periodic evaluations, the need is perhaps all the more acute in these times of budgetary constraints. If the Program Review were to become an annual exercise, increasing competition for resources would make it all the more necessary to defend the EHP.

Who are the indicators for?

Who will use the indicators relates directly to the issue of why we need them in the first place and, in turn, influences the selection of those indicators which are judged most appropriate to the needs of indicator users.

In the broadest sense, indicators are for decision makers. There are, however, a variety of decision makers, each with different yet interdependent needs as shown below:

Decision makers	Their Needs
Program managers	indicators which will provide guidance in terms of how to adjust the program in order to achieve specific objectives

Program evaluators and senior civil servants	indicators to evaluate the program, and to allocate resources between different program activities
Politicians	evidence of program results, in order to show that something effective is being done, and to support re-election
The public	perception that their tax dollars are being spent wisely

"The public" is taken to include special interest groups, and not simply the general public. Public perception is important in the case of the EHP because we are talking of a federal program which also deals with matters in the provincial domain. This consideration perhaps adds to the burden to justify the maintenance of the program. Conversely, if it cannot be clearly justified, the question is raised "is it in fact necessary?"

Also important is the distinction between the needs of program managers and of program evaluators. While both are concerned with the effectiveness of the program, the program manager wants to know the relationship of program activities to impacts on human health, and how to adjust the program (or specific elements) to better achieve desired results. In contrast, the program evaluator and senior civil servant need to know if the program is cost-effective relative to its mandate, outputs and expected results. This distinction in needs must not only be recognized, but must also be reconciled when devising and attempting to implement suitable program indicators.

What types of indicators?

Perhaps the most challenging question in the workshop concerned what types of indicators are appropriate - or, for that matter, possible - for an evaluation of the impact of the Environmental Hazards Program.

As noted earlier, there was significant discussion of the distinction between indicators of overall program impact versus indicators of human health. It was eventually acknowledged that there is indeed a distinction. More important, it was also recognized that providing satisfactory indicators of the effects of program activities on human health is very difficult. Few if any such indicators exist (e.g., the effects of tobacco smoke), and measuring specific programs (e.g., contaminant exposure and effects) can be a lengthy and costly proposition because of elapsed time between exposure and the ability to detect effects.

Indicators of the *wellness* of the Canadian population were mentioned as a possible alternative to indicators of a reduction in morbidity and mortality. However, just as there are notable difficulties in providing indicators of disease, it was agreed that wellness, while an interesting proposition, was equally if not harder to measure.

Consequently, it was accepted that we should work with *indirect* indicators of program impact rather than *direct* indicators of health effects. To this end, we need to look more closely at the EHP's stated outputs and expected results, and investigate what indicators might be available (or developed) to illustrate how effectively these outputs and expected results have been produced or achieved. (See the logic chart for an identification of program outputs and expected results.)

In particular, it was suggested that instead of using the reduction in human morbidity and mortality caused by exposure to environmental contaminants and radiation hazards) as the objective to be measured for evaluation purposes, we should perhaps use risk reduction and, specifically, the outputs and expected results which flow from the program's risk management activities. It was felt that such an approach would open the door to a number of possible indicators.

Although there was general consensus with this approach, it was urged that two other considerations be kept in mind when developing indicators. First, we need indicators not only of *what has happened*, but also indicators of situations that *may arise* and therefore of actions to address these situations. Referred to as "triggers", these indicators would allow the program to not only react to what has already taken place, but to be in a position to decide what should take place.

In a similar vein, it was suggested that we should not strive simply for indicators that show, in a somewhat self-gratifying way, what we have done (and hopefully, done well) but also indicators that tell us what is missing and what we could do better.

What basis of indicator measurement is acceptable?

Several criteria to be used in assessing the usefulness of possible indicators were proposed; included were:

- Currency (i.e., timely, and based on up to date information)
- Simplicity, including the ease of communicating the indicator
- Credibility
- Consistency
- Feasibility (i.e., time and cost to obtain)
- Ability to provide early warning of potential problems
- Ability, of course, to determine whether program objectives are being met

Implicit throughout these criteria, of course, are considerations of how the indicator is measured. For scientists, measurement customarily equates to a *quantification* of results. It is expected that reported results will be scientifically based and defensible. Even to non-scientists external to a program, an inability to measure results may be taken as an indication of program failure.

It was noted earlier, however, that quantification of EHP impacts, especially in the realm of health effects, is problematic. In the absence therefore of quantitative data, qualitative measurements may be used. In fact, in most instances the so-called "lesser indicators" of program impact (i.e., indicators of outputs and expected results) do not lend themselves to quantifiable measurement, but rather to a qualitative assessment as was used elsewhere in this evaluation study (mail survey excluded).

It was noted that *inference* will eventually play a part in assessing program impact. Qualitative measurements of program outputs and expected results do not provide conclusive evidence of the program's impact upon its ultimate objective. It is at this point that a leap of faith is required, and that the ultimate impacts be inferred based on the information at hand. The willingness to make this inference will be a function of how well indicator users have been communicated with and "sold on the idea" of the rationale for the indicators in question.

How to implement indicators?

Several suggestions were made in terms of implementing future indicators, including:

- Indicators should be incorporated within the ongoing monitoring of programs
- It is important to keep in mind that certain indicators require sound baseline data
- Some indicators will require a long-term commitment
- The cost of generating indicators should not be at the expense of the program itself (i.e., not taking resources away from essential program activities)

Furthermore, development and implementation of indicators will require consensus among the parties involved, particularly program managers and program evaluators, as to which indicators are appropriate and how they will be generated. Although some trade-offs between scientific accuracy and management objectives may be required, acceptance of proposed indicators will be that much easier if the rationale for the indicators, and how they function, is communicated clearly to all concerned.

In a similar vein, it was suggested that clients of EHP's information and other outputs have a responsibility to provide feedback on the effectiveness or value of the program's products, and also to "give credit where credit is due" when using EHP data and information for their own purposes.

4.5 Some Possible Indicators

The deliberation by the individual working groups of the suggested discussion topics (setting measurable objectives, confirming existing indicators, filling the gaps with new indicators, and providing the necessary data and information) produced certain themes in common.

As we have already seen, most participants would agree that health indicators are inappropriate because of the lack of measurable impacts. This view was not universally accepted, with one group arguing that linkages may be drawn between program impact and health status; examples cited included: the reduction in tobacco smoke and a corresponding reduction in cancer and cardio-vascular and respiratory diseases; and reductions in ambient air pollutants and corresponding reductions in cardio-respiratory diseases.

For the most part, however, the groups focused on indicators tied to the mid-points of the program logic chart; i.e., indicators of the program's outputs and expected results. Suggestions made by the groups covered such a wide range of indicators (indicators of outputs and of expected results, as well as existing - or perhaps readily available indicators - and possible or future indicators) that we will not attempt to present these here. Instead, summaries of the group presentations are contained in the Appendix to this report.

Some examples are however worthwhile. Generating indicators of outputs is relatively straightforward, and can be as simple as counting the number of publications, papers, ministerial briefings, etc., produced. Better still, it was suggested, would be to solicit client opinions regarding their satisfaction with information and communications outputs. Is the information produced acceptable, current, complete, useful and timely? Are other communications likewise timely, comprehensible and credible?

More desirable and of greater utility are indicators of the program's expected results because they offer evidence of action on the part of target groups, and perhaps require (in the absence of direct indicators of health impacts) less in the way of a leap of faith regarding program impact than do measurements of outputs. The expected outputs in question, with examples of possible indicators, are:

- Improvement of health risk management by other bodies (e.g., extent to which there is adoption of guidelines and standards)

- Compliance by industries and institutions (e.g., Bill C-62 compliance plans)

- More informed decision making by workers and the public (e.g., surveying joint health and safety committees regarding changes in use of chemicals, or data on sales of preventive products, such as sunscreen)

These expected results all have a distinct client/user orientation; indicators, participants suggested, can be generated by "surveying" clients in one fashion or another. The fourth expected result identified in the logic chart - the reduction in excessive human exposure to contaminants and radiation hazards - needs to be approached in a somewhat different manner. While indications of reduction may again be obtained through surveying key target groups, biomarker indicators are possible by multi-media sampling of selected substances and body-burden sampling.

Noteworthy in the group presentations was the emphasis on EHP program "clients". In the absence, once again, of adequate measures of the program's impact on health, many participants would appear to believe that the answer lies in "asking the client". However, there also appears to be differences in opinion as to who is, and is not a program client. Some would argue that EHP program clients are any and all users or recipients of the program's outputs or "products", including other government departments. Others hold a more restrictive view, suggesting that OGD's are not clients of this quasi-regulatory and advisory program.

4.6 Conclusions

There were several inputs to the workshop findings; in addition to input provided by participants themselves (in plenary and working group sessions), we should not overlook the pre-workshop materials provided to participants, including the paper by Michael Holliday, and the summaries of interviews with officials within and outside Health Canada.

A significant degree of unanimity exists among these inputs. All agree with the difficulty, if not impossibility of generating indicators of the ultimate impact of the program upon a reduction of human morbidity and mortality. There is concurrence that measures of risk reduction offer a viable alternative to gauging program impact, and that more indirect, "softer" measurements of program impact can, and should be used.

Beyond this point, suggestions regarding specific indicators offered by the participants and contained in the pre-workshop materials do not so much disagree, but simply expand into a number of possibilities. Interviews with officials in other government departments and other non-government stakeholders (i.e., program clients) tended to focus not surprisingly on "user-related" indicators such as use of program outputs and users' perceptions of their value. PED's interviews with officials within Health Canada produced a more functional and potentially useful categorization of alternative indicators as follows:

- management process indicators (i.e., monitoring outputs)
- risk management guideline indicators (use of outputs)
- environmental hazard exposure indicators (e.g., hospital admissions)
- toxicity and contamination indicators
- public awareness indicators
- public behaviour indicators
- individual health status indicators

In his paper *Musings on Health and Environment Indicators*, Holliday offered a taxonomy of indirect but more scientifically based indicators of exposure reduction. The "article of faith" that must be accepted, however, is that a reduction of exposure will indeed result in a reduction of health risk. Furthermore, the challenge is to link program activities to a measured reduction in exposure. And of course, it assumes that the right hazards are in fact being measured.

While the workshop itself may not have come to any conclusions regarding specific indicators to use in the future, a number of candidate indicators were identified for further consideration.

Furthermore, the workshop provided the opportunity to explore the fundamental issues discussed above. Especially significant was the acknowledgement that the objective we are attempting to measure is perhaps inappropriate; rather than indicators of a reduction in human morbidity and mortality, it would be more productive to generate indicators of risk reduction, and specifically, indicators of the program outputs and expected results related to risk reduction.

Many such indicators may be based on qualitative and not just quantitative measures; for instance, client satisfaction with information provided by the EHP, or improvements in health risk management by other bodies. Recalling once again the evaluation study's original questions, some of these indicators may already be available as a result of earlier study investigations.

APPENDIX A

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November 21, 1994

ENVIRONMENTAL HAZARDS PROGRAM EVALUATION

INTERVIEW GUIDE
FEDERAL OFFICIALS OUTSIDE HEALTH CANADA AND NON-FEDERAL STAKEHOLDERS (MASTER COPY)

Interviewee name ________________________ **Interviewer** _______________
title ______________________ **Date** ______________________
organization ________________ **Time/start/finish** _________

(Before meeting, check topic/interviewee matrix for questions to be asked and not asked, and mark this guide accordingly.)

Thank interviewee for taking the time to participate in this evaluation of Health Canada's Environmental Hazards Program. Areas to investigate include the program's design and rationale, effectiveness, impacts, and alternatives. Similarly, we want to talk about the Environmental Health Directorate's delivery of the program, and in particular, the Chemical Hazards Bureau and the Radiation Protection Bureau. (Note: have **organization chart at hand if required.)**

Reiterate that the interview should take in the order of an hour **(change if appropriate to a given situation)** and that nothing discussed or subsequently included in the final report is for attribution.

Background (All)

1. Before we discuss the specifics of the Environmental Hazards Program, would you mind giving me an overview of your organization's mandate. I am especially interested in those aspects, if any, that relate to the protection of human health and safety?

2. Generally, where are the linkages or connections, if any, between your mandate and what you do, and the Environmental Health Directorate and the Environmental Hazards Program?

   (Note: throughout interview, if respondent appears unfamiliar with EHP, refer to and paraphrase material from program description. If such prompting is necessary, record in notes.)

Program Design and Rationale

Coordination with others (Evaluation Q#3)

Existence of adequate mechanisms to ensure coordination

There are a number of initiatives within various federal departments and agencies, and the provinces dealing with environmental hazards and human health and safety. The first topic I would like to address is the matter of coordination - or liaison - between Environmental Hazards Program activities and these other initiatives or activities. **(Note: emphasis is on coordination between and among, not by Health Canada or the Environmental Health Directorate.)**

3. Do you feel that adequate mechanisms exist to ensure productive coordination with other federal departments and agencies, and the provinces?

To ensure overall cost-effectiveness where responsibilities are shared?

To identify gaps in the mandates of the various players, including Health Canada and the Environmental Health Directorate?

To avoid overlaps and duplications?

(Probe for examples, particularly if answer is negative.)

How could situation be improved or remedied?

4. Do you feel there is sufficient input from Health Canada into other departments and other governments regarding their health messages to the public concerning health risks arising from environmental sources?

(Probe for examples, particularly if answer is negative.)

What should (needs to) be improved?

What could (can) be improved?

Effectiveness

Achievements and consequences of PSL assessments (Evaluation Q#4)

EHD consultations re. control implementation specifics (Q4c)

(Note: our interest in the following is with the consultation process used when developing control implementation strategies, not the strategies themselves.)

Officials in Environmental Health Directorate's Bureau of Chemical Hazards and in Environment Canada completed assessments of the toxicity of 44 priority substances under the Canadian Environmental Protection Act, in February 1994. **(Have copy of PSL assessment summary at hand; however, it is unlikely that anyone involved in and familiar with assessment process - and therefore responding to the following questions - will need to see the list.)**

5. What was your organizations's involvement, if any, in completing these assessments? **(if not involved, skip to #8)**

6. **(if involved)** What has been the impact or consequence of these assessments and consultations for your organization?

7. Were you satisfied with the extent of your involvement and the manner in which it was handled?

8. **(whether involved or not)** Could the process have been handled in a different way? In your opinion, how could the process be improved?

9. Are there further steps or consequences arising from the completion of these assessments that you expect will involve or affect your organization? **(probe for details)**

Effectiveness of EHD's administration of the RED Act and Regs (Evaluation Q#5)

The Environmental Health Directorate administers the Radiation Emitting Devices Act - which governs the sale and importation of radiation-emitting devices - and the Regulations pursuant to this Act.

Compliance (Evaluation Q#5b)

10. As far as you are aware, what is the extent of industrial and institutional **compliance** with regulatory actions and decisions taken under the RED Act?

    Is compliance with the RED Act an issue, do you think? **(if interviewee does not feel compliance is an issue, skip Q#11 and go to Q#12)**

11. What factors affect compliance in this instance?

    Are there other barriers to compliance?

12. Looking at the situation from the other side of the coin, are there problems, do you think, with the **enforcement** of these actions and decisions; for instance, inspections?

    (If yes) What are they? How could enforcement be improved?

Changes to RED Act and Regs (Evaluation Q#5c)

13. Do you feel that there are aspects of the administration of the Radiation Emitting Devices Act and Regulations that could be dropped, replaced with alternative approaches, or otherwise changed?

    While thinking of this question, you may wish to refer to the list of radiation-emitting devices provided with the letter. **(Note: have copy of list at hand.)** In your opinion, are there classes of devices listed that are a problem or are worth singling out, i.e. for which regulations are needed? different ways of regulating would be more effective? or where compliance with guidelines or regulations has been a problem?

    (Probe) Any others?

Effectiveness of EHP communications (Evaluation Q#6)

14. **(Non-federal government stakeholders only)** How effectively, do you think, does the Environmental Hazards Program, and the Environmental Health Directorate, **(Note: not Health Canada as a whole)** communicate with specific interest groups and with the public about actual public exposure to radiation and chemical hazards, and known health risks from such exposure? Very effectively, somewhat effectively, somewhat ineffectively, very ineffectively?

Would you please elaborate on your answer/explain your rating?

Protection of health and safety of Canadians (Evaluation Q#7a)

Type, timeliness and utility of information (Q#7a)

(All) The Environmental Health Directorate provides information and advice to governments, departments, agencies and others to help them manage health risks from environmental sources.

15. Have you ever received, or requested, any such information and advice from the Environmental Health Directorate and the Environmental Hazards Program? **(if no, skip to Q#17)**

(If yes) What kinds of information and advice have you received?

(Probe) Have you received:

- Health and the Environment - A Vital Link? **(Probe** - the full 200-page report or the short overview pamphlet?)
- The Sun, Your Baby and You?
- other pamphlets, such as "How Safe Is Your Drinking Water?" and "Health Risk Determination"?
- Health Protection Branch bulletins on specific issues?
- safety codes for devices (e.g., microwave and X-ray machines, etc.)?
- other? What?

Is there other information and advice you would like to receive? What?

(in cases where interviewee requested information) Were you satisfied with the response to your request for information or advice? **(Probe)** Please explain.

16. On the whole, was the information and/or advice which you received timely and useful?

(whether positive or negative) Could you elaborate on your answer by giving examples?

Was the information presented in a useful and understandable manner? **(go to Q#18)**

17. **(If no to Q#15)** Would you want to receive information or advice on how to better manage health risks from environmental sources?

What type of information would you want?

18. Do you get similar information and advice on the health aspects of environmental contaminants and hazards from sources other than the Environmental Health Directorate and Health Canada?

(If yes) What would that be, and from what departments or organizations?

19. **(only those who have obtained information/advice from EHD/EHP)** How would you compare the value and usefulness of this information or advice to what you get from the Environmental Health Directorate and Health Canada? **(probe)** Why?

Of the information and advice which you have received - from all sources - which would you consider to be the most useful?

20. What could the Environmental Health Directorate and Health Canada do better to provide information and advice on the health aspects of environmental contaminants and hazards?

21. If the Environmental Health Directorate didn't provide this information and advice, where would you turn?

22. What do you think would be the consequences if the Environmental Health Directorate were to stop providing information and advice? If it wasn't there, would it really matter to your organization?

Impacts

Protection of health and safety of Canadians (Evaluation Q#7)

23. Generally speaking, to what extent would you say the Environmental Hazards Program has contributed to the protection of the health and safety of Canadians? Significantly, somewhat, not very much, not at all?

    Why do you believe that? Could you elaborate on your answer?

24. Do you believe that the EHP has influenced positively the behaviour of industries, institutions, workers and the public?

    (If so) In what area?

    Could you give me some examples? Would you elaborate on why you feel there has/has not been an impact?

Indicators (Evaluation Q#7b)

25. Can you think of any information or data that would serve to indicate whether and to what extent the EHP is contributing, directly or indirectly, to a reduction in human morbidity and mortality rates, or to an increase in the quality of life of Canadians?

To your knowledge, do any suitable indicators exist at present? What?

Does your organization have any information it could share with us that might help to indicate these effects? **(if yes)** What?

Is there information or data that you might be able to provide in the future?

(Note: intent is not to acquire information, but simply identify its availability and nature)

Closing

25. Do you have any additional comments or suggestions regarding the Environmental Hazards Program which you would like to discuss?

Thank you

APPENDIX B

MAIL SURVEY

Survey on the Environmental Hazards Program (EHP)

Health Canada is conducting an evaluation of its Environmental Hazards Program (EHP). As part of the study, a sample of people who have been in contact with the Radiation Protection Bureau, the Chemical Hazards Bureau, or the Health Protection Branch are being surveyed. Your name was on this list. If this survey has mistakenly gone to the wrong person in your organization, please pass it along to the appropriate person. Please remember that all information will be held confidential by the ARA Consulting Group, and nothing that identifies individual respondents will be available to any party. Thank you!

Background

1. What type of organization do you work for? (Check one.)

☐1 Educational institution
☐2 Public library
☐3 Media
☐4 For-profit business
☐5 Federal government
☐6 Provincial government
☐7 Municipal or regional government
☐8 Health care institution
☐9 Private citizen
☐10 Public interest/advocacy
☐11 Trade/industry organization
☐12 Consumer organization
☐13 Health professional organization
☐14 Research institution
☐15 Other. What?________________

2. Please check off your interest in each of the following areas:

	High Interest	Medium Interest	Low Interest	None
Chemical hazards	☐1	☐2	☐3	☐4
Radiation-emitting Devices	☐5	☐6	☐7	☐8

Awareness

The EHP carries out a number of activities intended to inform stakeholders about risks associated with chemical substances and various radiation-emitting devices (e.g. X-ray machines, ultrasound, microwaves, etc.) We would like to know how aware you are of these activities.

3. How well-informed do you consider yourself to be about the following? (Check appropriate response.)

Chemical Hazards	Radiation-Emitting Devices	
☐1	☐2	Very informed
☐3	☐4	Fairly informed
☐5	☐6	Not very informed
☐7	☐8	Not at all informed
☐9	☐10	Don't know or not applicable

4. Are you aware that the EHP does the following types of activities? (Check all that apply.)

Chemical Hazards	Radiation-Emitting Devices	EHP Activity
☐1	☐2	Analyses health risks of exposure
☐3	☐4	Provides advice regarding options to reduce risks
☐5	☐6	Consults with other parties on risk management
☐7	☐8	Publishes information for the public
☐9	☐10	Monitors hazard and exposure levels
☐11	☐12	Develops instrumentation and methods to measure exposure
☐13	☐14	Produces guidelines of safe exposure levels and procedures
☐15	☐16	Drafts regulations for these hazards
☐17	☐18	Other. What?________________

5. Overall, how important a role has the EHP had in providing you with information on these hazards?

Chemical Hazards	Radiation-Emitting Devices	
☐1	☐2	Very important role
☐3	☐4	Fairly important role
☐5	☐6	Not very important role
☐7	☐8	Not at all important
☐9	☐10	Don't know or not applicable

Use of EHP Communications

6. Which of the following specific EHP communications items are you aware of? Which have you seen personally? (Check all that apply.)

Aware of	Have seen	
☐1	☐2	*Health and the Environment; A Vital Link*
☐3	☐4	*The Sun, Your Baby, and You*
☐5	☐6	Health Protection Branch *Issues* bulletins
☐7	☐8	Safety codes for devices (e.g., microwave and X-ray machines, etc.)
☐9	☐10	Other. What?________________

____

7. Which of the following types of EHP information have you personally used? (Check all that apply.)

Chemical Hazards	Radiation-Emitting Devices	Type of Information
☐1	☐2	Analyses of health risks of exposure
☐3	☐4	Advice regarding options to reduce risks
☐5	☐6	Consultations with EHP
☐7	☐8	Information for the public
☐9	☐10	Information on monitoring of hazard and exposure levels
☐11	☐12	Information on instrumentation and methods to measure exposure
☐13	☐14	Guidelines for safe exposure levels and procedures
☐15	☐16	Draft regulations
☐17	☐18	Other. What?________________

Effectiveness of Communications

8. How useful for you or your organization is the communication done by the EHP in the following areas?

Very Useful	Fairly Useful	Not Very Useful	Don't Know	
☐1	☐2	☐3	☐4	Analysis of health risks of exposure
☐5	☐6	☐7	☐8	Providing advice regarding options to reduce risks
☐9	☐10	☐11	☐12	Consultation with other parties on risk management
☐13	☐14	☐15	☐16	Publishing information for the public
☐17	☐18	☐19	☐20	Information on monitoring of hazard and exposure levels
☐21	☐22	☐23	☐24	Information on instrumentation and methods to measure exposure
☐25	☐26	☐27	☐28	Guidelines for safe exposure levels and procedures
☐36	☐37	☐38	☐32	Draft regulations

Please explain:

____

____

____

9. How useful has the EHP information been for you or your organization for the following purposes?

Very Useful	Fairly Useful Useful	Not Very	Don't Know	Purpose
☐1	☐2	☐3	☐4	As general information or a reference document
☐5	☐6	☐7	☐8	As a basis for decisions on personal risk exposure
☐9	☐10	☐11	☐12	As a basis for decisions on risk exposure for your organization
☐13	☐14	☐15	☐16	As a basis for developing regulations or policies
☐17	☐18	☐19	☐20	As input to your own research and development activities
☐21	☐22	☐23	☐24	As an aid to developing better ways of complying with health regulations (e.g. through improved technology, better labelling, better safety procedures)

10. Can you give us any examples of your use of EHP information in the kinds of areas found in the question above? Please be as specific as possible. In particular, if the EHP information has reduced the health risk of you or anyone in your organization, we would like to know exactly how.

11. Overall, how would you rate the communications efforts of the EHP in the following areas?

Very Good	Fairly Good	Not Very Good	Don't Know	
☐1	☐2	☐3	☐4	Overall quality (presentation, format, style, etc.)
☐5	☐6	☐7	☐8	Timeliness
☐9	☐10	☐11	☐12	Use of appropriate media
☐13	☐14	☐15	☐16	Credible and consistent with messages from other sources
☐17	☐18	☐19	☐20	Thorough
☐21	☐22	☐23	☐24	Appropriate level of technical detail

12. If you have not been involved in consultations with the EHP, please go to question 14. If you have, please continue.

During consultations you have attended with officials from the EHP, what has been the quality of the following?

High	Moderate	Low	
☐1	☐2	☐3	The organization of the event
☐4	☐5	☐6	The background material provided
☐7	☐8	☐9	Feedback (e.g., minutes, summary of later decisions, etc.)
☐10	☐11	☐12	Sincere effort to understand concerns of other participants
☐13	☐14	☐15	Sincere consideration in responding to the concerns of other participants

13. Would you wish to have more input into the activities of the EHP through increased involvement in consultations?

☐1 Yes ☐2 No ☐3 Don't know

Alternatives

14. Generally, how useful is the information provided by the EHP, and that supplied by other sources of similar information?

Very Useful	Fairly Useful	Not Very Useful	Don't know or Not Applicable	Information from
☐1	☐2	☐3	☐4	The EHP
☐5	☐6	☐7	☐8	Your own organization
☐9	☐10	☐11	☐12	Other government organizations
☐13	☐14	☐15	☐16	Educational institutions
☐17	☐18	☐19	☐20	Industry and industry associations
☐21	☐22	☐23	☐24	The news media
☐25	☐26	☐27	☐28	Health care providers, institutions and associations
☐29	☐30	☐31	☐32	Consumer and public service agencies
☐33	☐34	☐35	☐36	Other What?______________

15. If the information provided by the EHP is more useful — or less useful — than that supplied by other organizations supplying similar facts, please explain why:

____

____

____

16. What impact would there be for you or your organization if the EHP did not provide information and advice? (Check applicable answer.)

☐1 Strong negative impact
☐2 Moderate negative impact
☐3 Not much impact of any sort
☐4 Moderate positive impact
☐5 Strong positive impact
☐6 Don't know

Please explain:

____

____

____

____

____

17. If the EHP no longer provided this information and advice, where would you go in order to replace it? (Check all that apply.)

☐1 Would not bother trying to replace the information
☐2 Would not be able to replace the information
☐3 Your own organization
☐4 Other government organizations
☐5 Educational institutions
☐6 Industry and industry associations
☐7 The media
☐8 Health care institutions and associations
☐9 Consumer and public service agencies
☐10 Other. What?________________________

18. Anything you wish to add?

____

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Thank You! **Please mail to:**
Dennis Rank
350 - 355 Burrard Street
Vancouver, B.C. V6C 2G8

Or Fax to:
Dennis Rank
(604) 669-7390

Results From All Respondents By Source

Exhibit 1.1: Response by Source

Source	*Mailed*	*Returns*	*Percentage*
Radiation Protection Bureau	20	10	50%
Chemical Hazards Bureau	250	96	38%
Health Protection Branch	720	213	30%
Total	990	319	32%

Results From All Respondents By Source

Exhibit 2.1: Respondents' Organization

Organization	**Percentage of Respondents**		
	RPB & CHB	***HPB***	***Overall***
Educational institution	8	4	6
Public library	2	10	7
Media	1	3	2
For-profit business	35	18	24
Federal government	8	4	5
Provincial government	14	4	7
Municipal or Regional government	2	2	2
Health care institution	5	39	28
Private citizen	0	0	0
Public interest/advocacy	1	0	1
Trade/industry organization	8	3	5
Consumer organization	0	0	0
Health professional organization	1	3	2
Research institution	3	1	2
Other	12	7	8

Results From All Respondents By Source

Exhibit 3.1: Interest in Chemical Hazards Health Area

Source	Percentage of Respondents			
	High	*Medium*	*Low*	*None*
Radiation Protection Bureau and Chemical Hazards Bureau	77	16	4	3
Health Protection Branch	40	43	15	2
Overall	52	34	11	2

Results from All Respondents by Type of Organization

Exhibit 3.4: Interest in Chemical Hazards Health Area

Organization	**Percentage of Respondents**			
	High Importance	***Medium Importance***	***Low Importance***	***No Importance***
Public information	33	42	21	4
Industry and industry associations	61	27	10	2
Government	63	22	11	4
Health care institutions and associations	50	42	9	0
Research institutions	67	17	17	0
Other	43	43	10	3
Overall	52	34	12	2

Results From All Respondents By Source

Exhibit 4.1: Interest in Radiation-Emitting Devices Health Area

Source	Percentage of Respondents			
	High	***Medium***	***Low***	***None***
Radiation Protection Bureau and Chemical Hazards Bureau	31	24	29	17
Health Protection Branch	22	33	24	21
Overall	25	30	26	20

Exhibit 4.4: Interest in Radiation-Emitting Devices Health Area

Organization	Percentage of Respondents			
	High Importance	***Medium Importance***	***Low Importance***	***No Imporance***
Public information	33	35	27	4
Industry and industry associations	15	21	32	33
Government	20	38	29	13
Health care institutions and associations	32	30	19	19
Research institutions	50	17	17	17
Other	21	38	24	17
Overall	25	30	26	19

Results From All Respondents By Source

Exhibit 5.1: How Well Informed Respondents are about Chemical Hazards

	Percentage of Respondents				
Source	*Very Informed*	*Fairly Informed*	*Not very Informed*	*Not at All Informed*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	44	39	13	2	2
Health Protection Branch	17	51	25	4	2
Overall	26	47	21	3	2

Results for Respondents with High Interest in Hazardous Chemicals Health Area

Exhibit 5.2: How Well Informed Respondents are about Chemical Hazards

Source	Percentage of Respondents				
	Very Informed	*Fairly Informed*	*Not very Informed*	*Not at All Informed*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	59	31	9	0	1
Health Protection Branch	28	55	13	4	0
Overall	43	43	11	2	1

Exhibit 5.4: How Well Informed Respondents are about Chemical Hazards

	Percentage of Respondents				
Organization	*Very Informed*	*Fairly Informed*	*Not Very Informed*	*Not at all Informed*	*Don't Know/ Not Applicable*
Public information	15	43	34	6	2
Industry and industry associations	39	47	10	1	2
Government	31	47	13	4	4
Health care institutions and associations	16	50	29	4	0
Research institutions	67	0	33	0	0
Other	21	59	14	0	7
Overall	26	47	21	3	2

Results From All Respondents By Source

Exhibit 6.1: How Well Informed Respondents are about Radiation-Emitting Devices

Source	Percentage of Respondents				
	Very Informed	*Fairly Informed*	*Not very Informed*	*Not at All Informed*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	18	33	33	10	7
Health Protection Branch	9	34	34	9	13
Overall	12	34	34	9	11

Results for Respondents with High Interest in Radiation-Emitting Devices Health Area

Exhibit 6.3: How Well Informed Respondents are about Radiation-Emitting Devices

	Percentage of Respondents				
Source	*Very Informed*	*Fairly Informed*	*Not very Informed*	*Not at All Informed*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	42	42	15	0	0
Health Protection Branch	26	45	18	11	0
Overall	33	44	17	6	0

Exhibit 6.4: How Well Informed Respondents are about Radiation-Emitting Devices

	Percentage of Respondents				
Organization	*Very Informed*	*Fairly Informed*	*Not Very Informed*	*Not at All Informed*	*Don't Know/ Not Applicable*
Public information	14	37	37	8	4
Industry and industry associations	11	30	34	5	21
Government	9	38	40	6	6
Health care institutions and associations	10	39	29	13	9
Research institutions	67	0	17	17	0
Other	13	27	33	13	13
Overall	12	34	34	9	11

Results From All Respondents By Source

Exhibit 7.1: Awareness of EHP Activities Regarding Chemical Hazards

	Percentage of Respondents*		
Awareness that EHP:	***RPB & CHB***	***HPB***	***Overall***
Analyzes heath risks of exposure	44	45	45
Provides advice regarding options to reduce risks	35	41	39
Consults with other parties on risk management	25	26	25
Publishes information for the public	48	47	48
Monitors hazard and exposure levels	26	37	34
Develops instrumentation and methods to measure exposure	14	26	22
Produces guidelines of safe exposure levels and procedures	39	45	43
Drafts regulations for these hazards	38	44	42
Other	3	4	3

* Percent of respondents overall. The following checked no category:

- RPB & CHB 39%
- HPB 36%
- Overall 37%

Results for Respondents with High Interest in Hazardous Chemicals Health Area

Exhibit 7.2: Awareness of EHP Activities Regarding Chemical Hazards

Awareness that EHP:	Percentage of Respondents*		
	RPB & CHB	*HPB*	*Overall*
Analyzes heath risks of exposure	45	57	51
Provides advice regarding options to reduce risks	33	45	39
Consults with other parties on risk management	27	24	26
Publishes information for the public	44	59	51
Monitors hazard and exposure levels	23	37	30
Develops instrumentation and methods to measure exposure	15	27	21
Produces guidelines of safe exposure levels and procedures	38	54	46
Drafts regulations for these hazards	38	51	45
Other	4	5	4

* Percent of respondents overall. The following checked no category:

- RPB & CHB 41%
- HPB 22%
- Overall 31%

Exhibit 8.1: Awareness of EHP Activities Regarding Radiation-Emitting Devices

	Percentage of Respondents*		
Awareness that EHP:	*RPB & CHB*	*HPB*	*Overall*
Analyzes heath risks of exposure	32	41	38
Provides advice regarding options to reduce risks	27	36	33
Consults with other parties on risk management	16	22	20
Publishes information for the public	36	41	39
Monitors hazard and exposure levels	22	38	33
Develops instrumentation and methods to measure exposure	15	27	23
Produces guidelines of safe exposure levels and procedures	34	42	39
Drafts regulations for these hazards	25	40	35
Other	1	4	3

* Percent of respondents overall. The following checked no category:

- RPB & CHB 43%
- HPB 41%
- Overall 42%

Exhibit 8.3: Awareness of EHP Activities Regarding Radiation-Emitting Devices

Awareness that EHP:	Percentage of Respondents*		
	RPB & CHB	*HPB*	*Overall*
Analyzes heath risks of exposure	50	58	55
Provides advice regarding optons to reduce risks	46	45	45
Consults with other parties on risk management	35	26	30
Publishes information for the public	46	55	52
Monitors hazard and exposure levels	27	55	44
Develops instrumentation and methods to measure exposure	27	29	28
Produces guidelines of safe exposure levels and procedures	54	61	58
Drafts regulations for these hazards	42	63	55
Other	4	5	5

* Percent of respondents overall. The following checked no category:

- RPB & CHB 27%
- HPB 21%
- Overall 23%

Results From All Respondents By Source

Exhibit 9.1: Importance of the EHP's Role in Providing Information on Chemical Hazards

	Percentage of Respondents				
Source	*Very Important*	*Fairly Important*	*Not Very Important*	*Not at All Important*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	10	20	23	25	24
Health Protection Branch	15	17	29	14	25
Overall	13	18	27	17	25

Exhibit 9.2: Importance of the EHP's Role in Providing Information on Chemical Hazards

	Percentage of Respondents				
Source	*Very Important*	*Fairly Important*	*Not Very Important*	*Not at All Important*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	12	21	22	23	22
Health Protection Branch	19	19	30	8	24
Overall	16	20	26	16	23

Results from All Respondents by Type of Organization

Exhibit 9.4: Importance of the EHP's Role in Providing Information on Chemical Hazards

Organization	Percentage of Respondents				
	Very Important	*Fairly Important*	*Not Very Important*	*Not at All Important*	*Don't Know/ Not Applicable*
Public information	13	24	28	15	20
Industry and industry associations	6	16	29	23	26
Government	16	26	26	12	21
Health care institutions and associations	20	16	25	14	25
Research institutions	0	0	40	20	40
Other	14	14	25	21	25
Overall	13	18	27	17	24

Results From All Respondents By Source

Exhibit 10.1: Importance of the EHP's Role in Providing Information on Radiation-Emitting Devices

Source	Percentage of Respondents				
	Very Important	*Fairly Important*	*Not Very Important*	*Not at All Important*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	9	18	9	30	33
Health Protection Branch	12	14	29	15	31
Overall	11	15	22	20	32

Exhibit 10.3: Importance of the EHP's Role in Providing Information on Radiation-Emitting Devices

Source	Percentage of Respondents				
	Very Important	*Fairly Important*	*Not Very Important*	*Not at All Important*	*Don't Know/ Not Applicable*
Radiation Protection Bureau and Chemical Hazards Bureau	15	31	12	31	12
Health Protection Branch	24	22	27	19	8
Overall	21	25	21	24	10

Results from All Respondents by Type of Organization

Exhibit 10.4: Importance of the EHP's Role in Providing Information on Radiation-Emitting Devices

	Percentage of Respondents				
Source	*Very Important*	*Fairly Important*	*Not Very Important*	*Not at All Important*	*Don't Know/ Not Applicable*
Public information	17	21	25	17	21
Industry and industry associations	5	9	19	25	41
Government	9	16	30	18	27
Health care institutions and associations	15	18	22	15	29
Research institutions	0	0	0	25	75
Other	12	15	19	27	27
Overall	11	15	22	20	31

Exhibit 11.1: Awareness of Specific EHP Products

Products	Percentage of Respondents*					
	RPB & CHB		*HPB*		*Overall*	
	Aware Of	*Have Seen*	*Aware Of*	*Have Seen*	*Aware Of*	*Have Seen*
Health and the Environment: A Vital Link	10	15	15	15	13	15
The Sun, Your Baby, and You	7	6	12	15	10	12
Health Protection Branch *Issues* bulletins	25	24	31	37	29	33
Safety codes for devices (e.g., microwave and x-ray machines, etc.)	17	17	18	18	18	18
Other	4	5	1	1	2	2

* Percent of respondents overall. The following checked no category:

- RPB & CHB 47%
- HPB 34%
- Overall 38%

Exhibit 12.1: Use of EHP Information on Chemical Hazards

Personal Use Of:	**Percentage of Respondents***		
	RPB & CHB	***HPB***	***Overall***
Analyses heath risks of exposure	19	11	14
Advice regarding options to reduce risks	9	10	10
Consultations with EHP	14	5	8
Information for the public	22	23	23
Information on monitoring of hazard and exposure levels	11	9	10
Information on instrumentation and methods to measure exposure	5	2	3
Guidelines for safe exposure levels and procedures	24	18	20
Draft regulations	14	11	12
Other	3	1	2

* Percent of respondents overall. The following checked no category:

- RPB & CHP 57%
- HPB 57%
- Overall 57%

Exhibit 12.2: Use of EHP Information on Chemical Hazards

Personal Use Of:	Percentage of Respondents*		
	RPB & CHB	*HPB*	*Overall*
Analyses of health risks of exposure	23	12	18
Advice regarding options to reduce risks	13	10	11
Consultations with EHP	15	7	12
Information for the public	22	26	24
Information on monitoring of hazard and exposure levels	13	12	13
Information on instrumentation and methods to measure exposure	4	4	4
Guidelines for safe exposure levels and procedures	28	20	24
Draft regulations	17	15	16
Other	3	1	2

* Percent of respondents overall. The following checked no category:

- RPB & CHB 50%
- HPB 48%
- Overall 49%

Results From All Respondents By Source

Exhibit 13.1: Use of EHP Information on Radiation-Emitting Devices

	Percentage of Respondents*		
Personal Use Of:	***RPB & CHB***	***HPB***	***Overall***
Analyses of health risks of exposure	3	8	9
Advice regarding options to reduce risks	4	7	6
Consultations with EHP	7	3	4
Information for the public	9	19	16
Information on monitoring of hazard and exposure levels	8	9	8
Information on instrumentation and methods to measure exposure	6	6	6
Guidelines for safe exposure levels and procedures	16	17	17
Draft regulations	4	7	6
Other	2	0	1

* Percent of respondents overall. The following checked no category:

RPB & CHB	72%
HPB	62%
Overall	66%

Exhibit 13.3: Use of EHP Information on Radiation-Emitting Devices

Personal Use Of:	Percentage of Respondents*		
	RPB & CHB	*HPB*	*Overall*
Analyses heath risks of exposure	8	13	11
Advice regarding options to reduce risks	8	11	9
Consultations with EHP	25	0	9
Information for the public	27	24	25
Information on monitoring of hazard and exposure levels	15	16	16
Information on instrumentation and methods to measure exposure	19	5	11
Guidelines for safe exposure levels and procedures	31	29	30
Draft regulations	12	16	14
Other	8	0	14

* Percent of respondents overall. The following checked no category:

RPB & CHB	42%
HPB	50%
Overall	47%

Exhibit 14.1: Overall Usefulness of EHP Communication to Respondent or Respondent's Organization

Type of Communication	Percentage of Respondents Providing Data*			
	Very Useful	*Fairly Useful*	*Not Very Useful*	*Don't Know*
Analysis of health risks of exposure	18	26	16	40
Providing advice regarding options to reduce risks	17	21	19	42
Consultation with other parties on risk management	9	14	22	55
Publishing information for the public	19	28	16	37
Information on monitoring of hazard and exposure levels	14	21	20	45
Information on instrumentation and methods to measure exposure	11	16	21	53
Guidelines for safe exposure levels and procedures	21	28	14	37
Draft regulations				

Exhibit 14.2: Overall Usefulness of EHP Communication to Respondent or Respondent's Organization

Type of Communication	Percentage of Respondents Providing Data*			
	Very Useful	*Fairly Useful*	*Not Very Useful*	*Don't Know*
Analysis of health risks of exposure	21	24	13	42
Providing advice regarding options to reduce risks	17	22	17	44
Consultation with other parties on risk management	12	10	17	61
Publishing information for the public	19	29	17	35
Information on monitoring of hazard and exposure levels	17	21	16	46
Information on instrumentation and methods to measure exposure	14	17	17	52
Guidelines for safe exposure levels and procedures	23	34	12	32
Draft regulations	12	22	18	48

Results for Respondents with High Interest in Radiation-Emitting Devices Health Area

Exhibit 14.3: Overall Usefulness of EHP Communication to Respondent or Respondent's Organization

Type of Communication	Percentage of Respondents Providing Data*			
	Very Useful	*Fairly Useful*	*Not Very Useful*	*Don't Know*
Analysis of health risks of exposure	25	29	16	31
Providing advice regarding options to reduce risks	27	31	11	31
Consultation with other parties on risk management	19	14	12	56
Publishing information for the public	27	39	12	23
Information on monitoring of hazard and exposure levels	23	29	19	29
Information on instrumentation and methods to measure exposure	17	30	22	30
Guidelines for safe exposure levels and procedures	26	39	10	26
Draft regulations	22	33	15	30

Exhibit 14.4: Overall Usefulness of EHP Communication to Respondent or Respondent's Organization

Type of Communication	*Percentage of Respondents Indicating EHP communication is "Very Useful"*					
	Public Info	*Industry*	*Gov't*	*Health Care*	*Research*	*Other*
Analysis of health risks of exposure	18	14	26	17	40	18
Providing advice regarding options to reduce risks	21	10	14	24	40	13
Consultation with other parties on risk management	5	3	11	13	40	14
Publishing information for the public	23	13	15	21	25	36
Information on monitoring of hazard and exposure levels	23	9	14	15	25	9
Information on instrumentation and methods to measure exposure	13	6	12	11	40	14
Guidelines for safe exposure levels and procedures	20	11	33	21	40	27
Draft regulations	8	9	9	15	40	15

Exhibit 15.1: Usefulness of EHP Information for Specific Purposes for Respondents or Respondent's Organization

Type of Use	Percentage of Respondents Providing Data*			
	Very Useful	*Fairly Useful*	*Not Very Useful*	*Don't Know*
As general information or a reference document	16	33	19	31
As a basis for decisions on personal risk exposure	6	19	37	39
As a basis for decisions on risk exposure for your organization	8	21	31	40
As a basis for developing regulations or policies	9	20	29	42
As input into your own research and development activities	7	17	32	44
As an aid to developing better ways of complying with health regulations (e.g., through improved technology, better labelling, better safety procedures)	12	22	27	40

* The following checked no category:

- RPB & CHB 15%
- HPB 18%
- Overall 17%

Exhibit 15.2: Usefulness of EHP Information for Specific Purposes for Respondents or Respondent's Organization

	Percentage of Respondents Providing Data*			
Type of Use	*Very Useful*	*Fairly Useful*	*Not Very Useful*	*Don't Know*
As general information or a reference document	18	38	17	27
As a basis for decisions on personal risk exposure	6	18	39	37
As a basis for decisions on risk exposure for your organization	11	21	32	36
As a basis for developing regulations or policies	9	26	27	38
As input into your own research and development activities	6	18	32	44
As an aid to developing better ways of complying with health regulations (e.g., through improved technology, better labelling, better safety procedures)	13	25	26	36

* The following checked no category:

- RPB & CHB 14%
- HPB 10%
- Overall 12%

Results for Respondents with High Interest in Radiation-Emitting Devices Health Area

Exhibit 15.3: Usefulness of EHP Information for Specific Purposes for Respondents or Respondent's Organization

Type of Use	**Percentage of Respondents Providing Data***			
	Very Useful	*Fairly Useful*	*Not Very Useful*	*Don't Know*
As general information or a reference document	19	39	22	20
As a basis for decisions on personal risk exposure	8	23	38	32
As a basis for decisions on risk exposure for your organization	8	27	35	31
As a basis for developing regulations or policies	11	24	35	30
As input into your own research and development activities	6	16	41	37
As an aid to developing better ways of complying with health regulations (e.g., through improved technology, better labelling, better safety procedures)	13	32	26	30

* The following checked no category:

- RPB & CHB 19%
- HPB 11%
- Overall 14%

Results from All Respondents by Type of Organization

Exhibit 15.4 Usefulness of EHP Information for Specific Purposes for Respondents or Respondent's Organization

Type of Communication	*Percentage of Respondents Indicating EHP Communication is "Very Useful"*					
	Public Info	*Industry*	*Gov't*	*Health Care*	*Research*	*Other*
As general information or a reference document	9	11	37	14	17	22
As a basis for decisions on personal risk exposure	5	6	8	4	17	5
As a basis for decisions on risk exposure for your organization	5	6	13	13	17	0
As a basis for developing regulations or policies	5	3	13	14	20	10
As inpout into your own research and development activities	5	6	13	3	17	14
As an aid to developing better ways of complying with health regulations (e.g., through improved technology, better labelling, better safety procedures)	12	10	8	14	20	18

* The following checked no category:

- Public Info 10%
- Industry 18%
- Gov't 9%
- Health 22%
- Research 0%
- Other 23%
- Overall 17%

Exhibit 16.1: Quality of EHP Communications

Factor	Percentage of Respondents Providing Data*			
	Very Good	*Fairly Good*	*Not Very Good*	*Don't Know*
Overall quality (presentation, format, style, etc.)	9	32	12	47
Timeliness	7	20	16	56
Use of appropriate media	5	18	20	57
Credible and consistent with messages from other sources	9	23	12	55
Thorough	9	24	13	54
Appropriate level of technical detail	11	25	13	51

* The following checked no category:

RPB & CHB	13%
HPB	18%
Overall	17%

Exhibit 16.2: Quality of EHP Communications

Factor	Percentage of Respondents Providing Data*			
	Very Good	*Fairly Good*	*Not Very Good*	*Don't Know*
Overall quality (presentation, format, style, etc.)	11	35	12	43
Timeliness	8	20	19	53
Use of appropriate media	6	17	22	55
Credible and consistent with messages from other sources	9	26	11	54
Thorough	11	28	12	50
Appropriate level of technical detail	14	28	13	46

* The following checked no category:

RPB & CHB	13%
HPB	12%
Overall	13%

Exhibit 16.3: Quality of EHP Communications

Factor	Percentage of Respondents Providing Data*			
	Very Good	*Fairly Good*	*Not Very Good*	*Don't Know*
Overall quality (presentation, format, style, etc.)	16	35	16	33
Timeliness	9	23	19	49
Use of appropriate media	9	20	22	50
Credible and consistent with messages from other sources	13	32	13	42
Thorough	15	21	17	46
Appropriate level of technical detail	16	29	13	42

* The following checked no category:

- RPB & CHB 12%
- HPB 13%
- Overall 13%

Exhibit 16.4: Quality of EHP Communications

Type of Communication	Percentage of Respondents Indicating EHP Communication is "Very Good"					
	Public Info	Industry	Gov't	Health Care	Research	Other
Overall quality (presentation, format, style, etc.)	11	8	5	9	33	13
Timeliness	10	6	10	5	17	9
Use of appropriate media	8	6	3	5	25	0
Credible and consistent with messages from other sources	12	10	8	7	17	14
Thorough	7	4	15	11	17	4
Appropriate level of technical detail	14	9	20	8	17	9

* The following checked no category:

Public Info	10%
Industry	18%
Gov't	11%
Health	20%
Research	0%
Other	23%
Overall	16%

Results From All Respondents By Source

Exhibit 17.1: Quality of EHP Consultations

A. Percent of respondents indicating they had participated in consultations:

RPB & CHB	9%
HPB	6%
Overall	23%

B. About 61% of consultation participants wished even more consultation involvement.

C. Quality of Consultation:

	Percentage of Respondents Overall Involved in Consultations		
	High Quality	***Moderate Quality***	***Low Quality***
The organization of the event	35	44	22
The background material provided	42	29	29
Feedback (e.g., minutes, summary of later decisions, etc.)	27	50	23
Sincere effort to understand concerns of other participants	36	32	32
Sincere consideration in responding to the concerns of other participants	20	45	35

Results From All Respondents By Source

Exhibit 18.1: Comparative Usefulness of Information from the EHP and Other Organizations

Type of Use	Percentage of Respondents Providing Data*			
	Very Useful	*Fairly Useful*	*Not Very Useful*	*Don't Know*
The EHP	12	31	12	45
Respondent's own organization	21	33	11	35
Other government organizations	15	43	12	30
Educational institutions	8	26	21	45
Industry and industry associations	14	27	17	42
The news media	3	19	41	38
Health care providers, institutions and associations	16	31	18	35
Consumer and public service agencies	6	29	23	43
Other	12	4	10	74

* The following checked no category:

- RPB & CHB 13%
- HPB 15%
- Overall 14%

Results from All Respondents by Type of Organization

Exhibit 18.4: Comparative Usefulness of Information from the EHP and Other Organizations

Type of Communication	*Percentage of Respondents Indicating EHP Communication is "Very Useful"*					
	Public Info	*Industry*	*Gov't*	*Health Care*	*Research*	*Other*
The EHP	10	9	20	14	17	8
Respondent's own organization	18	24	18	21	50	22
Other government organizations	10	17	10	9	0	17
Educational institutions	8	4	8	12	0	14
Industry and industry associations	11	22	3	14	33	10
The news media	5	0	5	5	0	0
Health care providers, institutions and associations	11	10	5	28	40	13
Consumer and public service agencies	5	4	3	9	25	9
Other	6	19	13	0	0	27

* The following checked no category:

Public Info	16%
Industry	14%
Gov't	11%
Health	15%
Research	0%
Other	13%
Overall	14%

Exhibit 19.1: Impact for Respondent or Respondent's Organization if the EHP did not Provide Information and Advice

Source	Percentage of Respondents					
	Strong Negative Impact	*Moderate Negative Impact*	*Not Much Impact*	*Moderate Positive Impact*	*Strong Positive Impact*	*Don't Know*
Radiation Protection Bureau and Chemical Hazards Bureau	4	23	40	2	0	31
Health Protection Branch	5	23	39	1	1	32
Overall	5	23	40	1	0	31

Exhibit 19.2: Impact for Respondent or Respondent's Organization if the EHP did not Provide Information and Advice

Source	Percentage of Respondents					
	Strong Negative Impact	*Moderate Negative Impact*	*Not Much Impact*	*Moderate Positive Impact*	*Strong Positive Impact*	*Don't Know*
Radiation Protection Bureau and Chemical Hazards Bureau	4	23	44	3	0	26
Health Protection Branch	9	25	33	0	0	33
Overall	7	24	38	1	0	30

Exhibit 19.3: Impact for Respondent or Respondent's Organization if the EHP did not Provide Information and Advice

Source	Percentage of Respondents					
	Strong Negative Impact	*Moderate Negative Impact*	*Not Much Impact*	*Moderate Positive Impact*	*Strong Positive Impact*	*Don't Know*
Radiation Protection Bureau and Chemical Hazards Bureau	4	38	29	4	0	25
Health Protection Branch	6	27	39	0	0	27
Overall	5	32	35	2	0	26

Results from All Respondents by Type of Organization

Exhibit 19.4: Impact for Respondent or Respondent's Organization if the EHP did not Provide Information and Advice

Source	Percentage of Respondents					
	Strong Negative Impact	*Moderate Negative Impact*	*Not Much Impact*	*Moderate Positive Impact*	*Strong Positive Impact*	*Don't Know*
Public Information	2	18	47	0	0	33
Industry and industry organizations	2	18	44	2	0	33
Government	13	35	28	0	0	25
Health care institutions and associations	5	26	40	0	0	30
Research institutions	0	20	60	0	0	20
Other	4	19	31	8	0	39
Overall	5	23	40	1	0	31

Results From All Respondents By Source

Exhibit 20.1: Sources of Alternate Information and Advice if the EHP did not Provide it

Sources	Percentage of Respondents Providing Data*		
	RPB & CHB	*HPB*	*Overall*
Respondent would not bother trying to replace the information	7	7	7
Respondent would not be able to replace the information	3	5	4
Respondent's own organization	35	23	27
Other government organizations	48	48	48
Educational institutions	20	24	23
Industry and industry associations	32	32	32
The media	3	8	7
Health care institutions and associations	9	40	30
Consumer and public service agencies	13	19	17
Other	13	4	7

* The following checked no category:

- RPB & CHB 20%
- HPB 20%
- Overall 20%

APPENDIX C

INDICATORS WORKSHOP

EVALUATION OF THE ENVIRONMENTAL HAZARDS PROGRAM

WORKSHOP ON INDICATORS OF PROGRAM IMPACT

Tuesday April 4, 1995
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MUSINGS ON HEALTH AND ENVIRONMENT INDICATORS

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1. INTRODUCTION

As was identified in the hand-out that accompanied the invitation to attend the *Workshop on Indicators of Program Impact*, the aims of the Environmental Hazards Program (EHP) are:

> To identify, assess and manage the risks to health and safety, and the benefits, associated with the natural and technological environment, particularly of marketed radiation-emitting and chemical products, in order to protect the health of Canadians from environmental hazards.

And the ultimate objective of this sweeping, if somewhat impenetrable, statement was identified as:

> A reduction in the human morbidity and mortality caused by exposure to environmental contaminants and radiation hazards.

This objective in fact forms the ultimate indicator of the success of the program. It consists of two elements — relating morbidity and mortality to exposure to environmental hazards and relating changes in such morbidity and mortality to actions of the program. In practice, however, it is very difficult to demonstrate one such relationship, let alone both and therefore less "ideal" indicators will usually have to be chosen.

This paper does not pretend to be a definitive treatment of the "indicator problem". Rather we aim to highlight some aspects of program indicators as a means of generating discussion during the Workshop. In preparing the paper, we have drawn on information gathered during our participation in this current program evaluation and our experience in conducting numerous evaluations of hazards in the fields of occupational and environmental health.

2. SCOPE OF THE PROBLEM

For all but a very few of the thousands of agents which could be considered environmental hazards, the relationships between morbidity/mortality indices and exposure are unknown or, at best, only partially understood.[1] In acknowledging this "fact of life", one is reduced — at best — to judging if the actions of the program have resulted in (or contributed to) a reduction of the exposure of Canadians to environmental hazards. In so doing, it would be necessary to make explicit the belief (as an article of faith, if you like) that a reduction in exposure will, of itself, result in a reduction in health risk. In addition, one could question whether the hazards chosen for study and action by the EHP are (among the tens of thousands of substances that pollute our environment) the "right" hazards.[2]

2.1 REDUCTION OF EXPOSURE

Canadians are exposed to environmental hazards by inhaling them from the air, by ingesting them from food and drink, and by absorbing them through their skin (UV exposure, for example). Governments, industry and even environmental lobby groups regularly monitor exposure to such hazards. There is, therefore, a potential to judge whether exposure to selected hazards[3] has changed and, presumably, been reduced. Measurement of actual pollutant exposure levels, however, is not the only way of judging whether exposure has been reduced. If, for example, a demonstrated change in public behaviour can be shown to decrease exposure to a particular hazard, it would probably be safe to assume that population exposure had in fact been reduced. In both these instances (the quantitative and the qualitative), all that will then be needed is to link the program activities with the reduction in exposure.

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[1] A notable exception is, of course, tobacco smoke. The problem in this case, however, is that those most at risk (and the risk is fairly well quantified) are tobacco smokers — and they indulge themselves voluntarily. For this not insignificant minority of the population, it could well be argued that tobacco smoke is not an environmental pollutant and hence not part of the EHP's concerns. Second-hand tobacco smoke, on the other hand, is very much an environmental pollutant, but its risk is only very poorly quantified.

[2] A definition of *right hazards* could well be: "those hazards whose reduction or elimination would (potentially) result in the greatest net health benefit to the Canadian population". Other definitions might well take into account such things as feasibility, special risk groups, and (dare we say it?) socio-economic and cost benefit considerations.

[3] The "selection", however, will depend as much on what such agencies saw fit to monitor as on whether the hazard is a priority concern in environmental health (*v. infra* for a discussion on the question of the "right" hazards).

2.1.1 Quantitative Approaches

Quantitative approaches to judging exposure reduction will have to rely heavily on the existence of an adequate corpus of monitoring data, but not exclusively so. The following are merely presented as examples to illustrate how exposure may be judged and what one might do with the information generated. We do not, however, know whether there are sufficient data available to make many of these ideas work.

Drinking water: There is a continuing series of *Guidelines for Canadian Drinking Water Quality* and over the years the number of drinking-water-quality parameters for which guidelines have been set has increased substantially. The supply of drinking water to Canadians is largely a municipal responsibility governed by the appropriate provincial health regulations. Some (if not most) provinces require municipalities to regularly monitor the quality of their drinking water and it may therefore be possible, from these data, to see if pollutant levels in drinking have been declining. If such time series data cannot be obtained, one could always go to the series of *Guidelines for Canadian Drinking Water Quality* to see for which pollutants guideline levels have decreased[4] and, based on the assumption that no municipality in its right mind would be providing water above current guideline limits, conclude that Canadian exposure to these pollutants from drinking water *de facto* had decreased.

Formaldehyde: Some years ago urea-formaldehyde foam insulation (UFFI), marketed with the encouragement of Energy Mines & Resources to warm up draughty old houses, was banned by the federal government. About 50,000 houses were insulated with the material in the few years that the home-insulation program was in existence. Data on formaldehyde levels in homes with and without UFFI and in homes before and after removal of the insulation are available in both the scientific literature and in Canada Mortgage and Housing Corporation reports. Clearly, the ban reduced potential exposure of a group of Canadians who would otherwise have insulated their homes with UFFI and, from the data on formaldehyde levels, one would be able to say by how much the exposure would have been reduced. If one were very brave, one could go even further and use the EHP's risk assessment data on formaldehyde to calculate the improvement in Canadian morbidity (and mortality?) occasioned by the ban.

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[4] The absence of a decrease in guideline level with time does not, of course, imply that there is still a health risk, but rather that the drinking-water subcommittee has concluded that the health of tap-water drinkers is adequately protected by the originally set level. For many of the parameters, if fact, the guideline level has remained constant for 20 years, and for a few others it has actually increased (recent scientific evidence having shown, perhaps, that the risks are not as severe as first thought).

Benzene: In the assessment of the first group of Priority Substances under the Canadian Environmental Protection Act (CEPA), benzene was declared toxic on health grounds and was selected as one of the substances assigned the highest priority for the development of control options. By far the greatest contribution to human exposure[5] is from benzene in the outdoor air. There are already considerable data, going back for several years, regarding levels of benzene in the air of Canadian cities. Provided that the monitoring activities that produced these data continue, it should be possible to demonstrate the effects of control measures instituted under CEPA. Furthermore, the CEPA health assessment contained a risk assessment model from which it is possible to estimate human mortality from leukæmia at current exposure levels. In the case of benzene exposure, therefore, one may approach the indicator ideal of relating mortality to program activity.

2.1.2 Qualitative Approaches

Many of the activities of the EHP rely heavily on effective communication to achieve program goals.[6] For such communication to be effective, not only should the information provided be "correct", but one must be satisfied that the target group (be it another government agency, special groups at risk, or the general public) both understands and acts upon the information. If these prerequisites are met, then communication can be an effective tool in reducing exposure to environmental pollutants: for example, by encouraging agencies with the appropriate mandates to promulgate regulations aimed at reducing population exposure or, in communication with the public, encouraging behavioural changes which will result in individuals reducing their own exposure. In these instances, the success of a program's activities would initially be judged by the effectiveness of such communication rather than by indicators more directly related to human-health outcomes such as morbidity/mortality statistics and exposure levels. These latter indicators may become applicable as the program matures.

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[5] Other than that derived from tobacco smoke.

[6] The Bioregional Health Effects Program and the Environmental UV Program, for example.

Environmental UV program: In dealing with an environmental hazard such as excessive exposure to sunlight, the possible risk-management options are quite limited. Scientific research into the mechanisms and probability of cancer is at an early stage. The scope for regulation is narrow: devising standards for sunglasses and requiring that commercial sunscreen packages display the corresponding Sun Protection Factor are the only regulatory options apparently taken to date; it is difficult to imagine any other realistic forms of regulation that would be effective. The only really practicable risk-management option is that of public communication, with the aim of changing public behaviour by such means as discouraging sunbathing, encouraging the use of sunscreen and suitable clothing for people who are exposed to the sun, and emphasising that children need particular protection. (Even the regulatory efforts so far employed are mainly communicative in intent.) It worth noting that, to be effective, such a program would have to bring about a public change of attitude that is effective even for people on vacation — when they might be expected to be both seeking the sun and out of reach of such reminders of the risk as the UV Index.

Similarly judging the effects of the UV program would have to be based on behavioural change or measures of education.[7] Such measures have the advantage that they might well show results in the relatively short term. (In view of the fact that Environment Canada has had an active public communication program dealing with UV risks for a number of years, it might be difficult, however, to establish that any particular program was responsible for any changes in public behaviour.) Health Canada has made a first step towards judging behavioural changes by asking a series of questions in the

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[7] Assessing the effects of the UV program directly from the incidence of UV-related diseases (such as skin cancers) would be difficult, because the greatest effects of exposure to sunlight are produced in childhood or the teens, while the associated cancers typically do not manifest themselves until the middle or late years of life. Even if the UV program succeeded in immediately and drastically reducing the amount of solar UV the typical Canadian was exposed to, it would probably be several decades before any effect on skin-cancer incidences could be seen.

Canada Health Monitor regarding practices associated with exposure to, and protection from, sunlight.[8]

The Great Lakes Health Effects Program: The GLHEP's approach to public health is manifestly proactive. Its efforts are focused on identifying hazards and using communication as a means of risk management. In this area, GLHEP communicates with both the public and with other agencies. In each case, the GLHEP acts as both a source and a two-way channel of information related to hazard identification and risk assessment. In fact, communication with the public is an explicit aim of the GLHEP as part of all its projects.

A major role of the GLHEP is that of "information broker". The Program supplies health-related information (from its own research and from the literature) and advice to a variety of bodies both within government and in the private sector. The content, intellectual level and media of presentation of the advice and information depend on the needs of the "target" group. The purpose of such advice and information is also varied, and its effectiveness can in most cases be assessed only indirectly. Judged simply by the numbers of presentations given and reports published, the effort expended in risk management through communication is successful. Such measures are in fact, at present, almost the only estimates of the effectiveness of these programs. In future it may be expected that the GLHEP will devote more effort to trying to assess how well these public communications are understood and what effects they have on public behaviour as it influences environmental health.

2.2 THE "RIGHT" HAZARDS?

It is all very well monitoring whether Canadian exposure to environmental hazards is decreasing or whether communication activities are effective, but the results of such exercises would be comparatively meaningless unless an attempt were also made to judge the environmental-health significance of the chosen hazards. The task, however, of deciding whether the chosen pollutants are the "right" ones is qualitatively different from, and more difficult than, determining whether the exposure of Canadians to environmental hazards is decreasing.

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[8] There were almost 2500 respondents to this questionnaire which was administered in February 1994 and covered behaviour since April 1993

The EHP has to choose which of the myriad of agents considered environmental hazards are to become subjects for investigation and action. This is a question of resource allocation (the EHP does not possess unlimited resources and can, therefore, only deal with a comparatively few hazards at any one time), of public pressure (asbestos in schools and lead in their drinking water, the anti-incinerator lobby and dioxins, UFFI in homes), of political pressure (tire and PCB fires, a potentially nasty chemical in the drinking water of a Minister's home riding, a PCB-sodden Trans Canada highway[9]) and, one would hope, of dispassionate and unbiased evaluation.[10]

In a rational world, a society would apportion its limited resources such that the greatest good would be achieved for the greatest number of people. One might apply this laudable ideal to the decision of whether the "right" hazards have been addressed by the EHP, and perhaps one should. But this is a very difficult task. Would a substance which has the potential to mildly irritate a significant proportion of the population (but otherwise has no foreseeable health effect), for example, take priority over one that has the potential to cause, say, one premature death in 1,000,000 after a lifetime of exposure?

In attempting to grapple with such topics, we are leaving the province of science and are entering the far fuzzier realms of ethics, politics and social science. Nonetheless, we would argue that it is incumbent upon the EHP to develop indicators which could measure whether the hazards being monitored and controlled are in fact the "right" ones.

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[9] This one, it might be remembered, brought down a government, removed a governing dynasty and left the province in question wondering if it would ever want to replace it with another.

[10] For one component of the EHP — the CEPA assessment of Priority Substances — the choice of the "right" hazards was determined by an independent body outside the control of Health and Welfare Canada. The process in place for the choice of the second Priority Substances List, however, appears to offer more opportunity for the EHP to make a contribution to the selection.

3. DISCUSSION

While the subject of indicators dealing with the "rightness" of choice of hazards to control would be a logical place to start a discussion of program indicators, we have to admit that we have no concrete ideas to offer on this topic. We shall therefore confine our comments to the easier category of indicators — those concerning the effectiveness of the EHP's activities in investigating, assessing and controlling the hazards it is currently concerned with. As is obvious from the previous section, there is a broad spectrum of indicators within this latter category (see Figure 1 for a summary) and the choice of indicators is often hazard specific. In this discussion we will explore some aspects of the use of such indicators.

3.1 HOW MUCH ARE YOU PREPARED TO PAY?

Given unlimited resources of time, personnel and money, any of the activities carried out by the EHP may be judged by the "ideal" indicator as represented by class 1 of Figure 1. But this observation is hardly a workable basis on which to develop indicators in reality. In practice, the choice of indicators is restricted by questions of feasibility.

In general, the more effective a program is, the easier it is to demonstrate and measure its effectiveness — a ten-percent change in human morbidity or mortality is easier to measure than a one-percent change — and, very often, what limits a program's effectiveness is the resources that are available to it. The question of indicators, in other words, cannot be considered in a vacuum, but must be approached from the perspective of what is financially, socially and politically reasonable as a goal for the activity in question and how important it is to measure the effect of that activity.

3.2 PATIENCE AND PLANNING

In any approach to judge the effectiveness of programs aimed at protecting environmental health, it must be realised that many of the health effects take a considerable time not only to manifest themselves but also to respond to reductions in exposure. This fact has to be taken into account when devising appropriate indicators of a program's effectiveness — especially when, as is invariably the case, the time frame available to judge success is comparatively short (typically, a "political" lifetime).

For example, many of the substances classified as toxic under s. 11(c) of CEPA were considered hazardous to human health on the grounds of carcinogenicity. A common feature of such substances — among others — is that their characteristic toxic endpoint develops only after prolonged exposure at environmental levels. This latency period is frequently years and may be several decades. Even if exposure to such substances could be eliminated immediately, it would therefore be a number of years before any changes in human morbidity or mortality associated with exposure to them could be demonstrated. In practice, for a number of potentially hazardous substances, there also environmental reasons why it is effectively impossible to eliminate exposure on a time scale much shorter than this. And for some substances, the human biological half-life is also as long as a decades or more, so that even if, somehow, environmental levels could be eliminated, the body burden (and therefore the potential for toxicity) would persist long after exposure had ceased.

This is not to say that nothing can be achieved in such cases, but rather that, if exposure to "long-term" environmental hazards is to be reduced to the point where changes in human health can be expected to become measurable, a coherent program of controls needs to be set up and then pursued consistently for as much as twenty or thirty years.

3.3 PRIOR PLANNING — BEFORE AND AFTER

A feature of any measure of program effectiveness is the requirement that the value of the chosen indicator must be known before controls were implemented. Furthermore, in most cases it is not sufficient merely to have a measurement of the indicator just prior to the implementation of a control effort — what is needed is a sufficiently long time series to establish a reliable baseline.

Consider, for example, the case of population exposure to foodborne cadmium.[11] A possible indicator, in this case, would be the level of cadmium in Canadian diets. At present there are only limited data available on the concentrations of cadmium in Canadian food and, in some cases, the concentrations measured in samples of the same

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[11] Excess ingestion of cadmium, a substance judged toxic to humans under CEPA, over long periods has been linked to kidney toxicity.

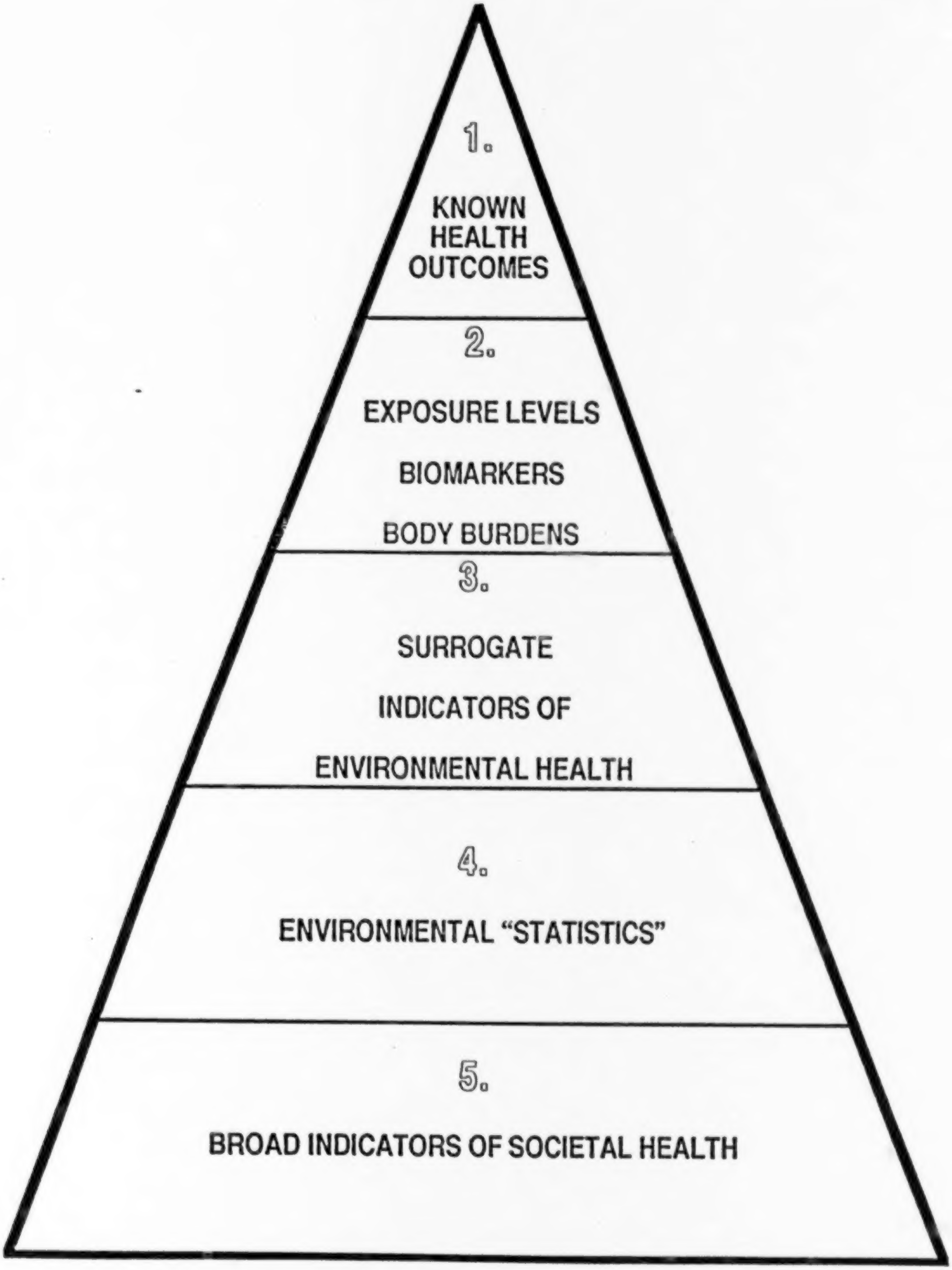
1.
KNOWN
HEALTH
OUTCOMES
2.
EXPOSURE LEVELS
BIOMARKERS
BODY BURDENS
3.
SURROGATE
INDICATORS OF
ENVIRONMENTAL HEALTH
4.
ENVIRONMENTAL "STATISTICS"
5.
BROAD INDICATORS OF SOCIETAL HEALTH

FIGURE 1 *"Taxonomy" of Health and Environment Indicators*
(after suggestions provided by N. Previsich)

FROM THE SPECIFIC TO THE GENERAL

1. Known relationships between morbidity/mortality and environmental hazards:
   e.g. ozone levels and admissions to acute-care hospitals,
   exposure to sunlight and incidence of skin cancers.

2. Measures of exposure of populations to environmental hazards:
   e.g. benzene levels in urban atmospheres,
   blood-lead levels in children,
   hexachlorobenzene levels in adipose tissue.

3. Incidence of accepted environmental-health standards being exceeded:
   e.g. times 24-hour atmospheric AQ standards exceeded,
   incidence of food exceeding heavy-metal guidelines,
   proportion of drinking-water supplies failing to meet the *Guidelines for Canadian Drinking Water Quality*.

4. General "statistics" of environmental quality:
   e.g. air pollution indices,
   the Atmospheric Environment Service's U-V Index,
   soil contamination by PCBs.

5. General indicators of societal health:
   e.g. nationwide longevity, infant mortality, etc.,
   public perception of environmental health,
   regional variations in morbidity and mortality.

FIGURE 1 (concluded)

foodstuff vary widely. Before the success of a cadmium control program could be judged, it would be necessary to obtain a much more extensive database of levels of cadmium in the Canadian diet. Of choice, such a database would extend over many years to average out such factors as climatic fluctuations that might influence the uptake of the element in food.

An alternative indicator of cadmium exposure would be levels of cadmium in the kidney (the target organ of the pollutant). Cadmium has a very long biological half life in humans (~30 years) and it would therefore be necessary not only to obtain baseline data of renal cadmium levels in the Canadian population but also to ensure that monitoring of these tissue levels was carried out for several decades after controls were instituted.

3.4 WHOSE INDICATORS?

The EHP is a science-based program. Those charged with management of the program are themselves scientists. They can therefore be expected to have an understanding of the assumptions and approximations made in using indicators other than the "ultimate" ones (i.e., those identified as class 1. in Figure 1). The same may not be true for those whose concern is evaluating the program from a purely managerial standpoint. Program managers and evaluators may have different understandings of the relationships between exposure to environmental hazards and health outcomes, and therefore different preferences in the ways such relationships may be used to develop indicators. It is essential therefore, that a consensus on indicators be reached between the managers and the evaluators.

4. PARTING THOUGHTS

We commenced this paper with the observation that it is very difficult to achieve the "ultimate" indicator of a program's effectiveness — namely linking an activity of the EHP to "a reduction in the human morbidity and mortality caused by exposure to environmental contaminants and radiation hazards". Using such an interpretation, one could conclude that the effectiveness of the program cannot really be "measured". And, in a climate of fiscal restraint, there may be those who would question whether a program should be continued if the outcome of that program cannot be measured.

As a counterpoint to such an assertion, we are reminded that the U.S National Academy of Sciences, writing on a similar topic, concluded that cost-benefit analysis (an "indicator" then in vogue) cannot be used alone in judging the need to act on environment-related health effects. As part of their conclusion, the Academy stated:

> "The costs of presumably protective actions ... can be reckoned; the magnitudes of the resultant health benefits, and their economic equivalents, in dollars, are largely unknown ... Instead, it is the norm of political behaviour to reckon benefits within the framework of a general set of subjective public value judgments rather than out of hard knowledge of their dollar equivalents — which are rarely available in any case. We ask what kind of country we want ours to be, and we ask what we can afford — and act accordingly.[12]

Such sentiments — admittedly written in a gentler political era (namely, 1981) — can be viewed as equally valid today.

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[12] U.S. National Academy of Sciences, *Costs of Environment-related Health Effects: A Plan for Continuing Study*, Report IOM-81-01, p. ix. Washington, DC: National Academy Press (1981).

INDICATORS WORKSHOP - WORKING GROUP NOTES
GROUP #1

Overview

Group #1 developed a matrix (see attached) which provides an overall framework for investigating indicators in the context of program "outputs" (vertical axis) and the four discussion topics tabled early in the workshop proceedings (horizontal axis; note that a 5th issue - marketing, or implementing indicators - was added).

Presentation Summary

The following explains each of the cells in the matrix:

1A Set the objectives to be reached by science; state clearly what is wanted. Decide how much money can be invested in research. Establish relevance of research to EHP objectives and "doability".

1B Measure research and information output by publication count, actual costs, and how well science met stated needs. Solicit qualitative client and peer opinions.

1C Areas largely unaddressed include: how to measure product excellence, value-added effects, and the extent to which work in the present may receive future recognition.

1D Data and information are needed about the extent to which EHP science is transferred into related programs and client actions, and the ease of application.

1E Give recognition to success stories. Improve mutual recognition of results and data by a wide range of players, including "clients". Do not reinvent the wheel.

2A Rank (prioritize) the problems to be solved. Determine the extent to which it is logical that resources be spread. Make allowance for the need to address unexpected problems. Define the minimum level of effort that is worth sustaining or that must be retained to run EHP. Anticipate issues and plan ahead in terms of how to deal with them. Consider how to harness non-Departmental resources, and forge common or shared objectives and compatibilities.

2B Program evaluation exists (e.g., this workshop). On a quantitative basis, departmental memoranda, ministerial memoranda and related paper trails can be tracked and counted. In addition, management contracts (e.g., DFO) can be used to assess task-specific productivities.

2C Information about the use of EHP outputs needs to be tracked and recorded. Mechanisms to provide feedback from client groups and other agencies need to be put in place.

2D Information required includes EHP client surveys, internal assessments, and external (independent) assessments.

2E Health Canada needs to make client/stakeholder groups aware that they have a responsibility to contribute to EHP, not only in terms of providing information, but also in terms of applying the program and providing feedback on this application. Groups such as lawyers, bankers, investors and insurers make decisions that later involve engineers, scientists, builders, farmers, etc.. At present, we tend to track EHP to the latter group; the key to future success is to get initial decision makers sensitive to EHP - to get the lawyers, bankers, etc. to recognize their responsibilities - and to provide mechanisms which hold them accountable. Users of EHP output should clearly identify their source (i.e., give credit where credit is due). EHP information should be more widely marketed; look for opportunities to apply the same information in different areas. Give clients "credit" for their feedback. Explore the whole topic of marketing EHP problem-solving capabilities, and find out what/where difficulties exist, and how to fix them.

3A Assess the need and practicality of guidelines. Aim to meet specific needs. Be specific about the form and application of guidelines.

3B Note the extent to which EHP guidelines become incorporated into voluntary guidelines and mandatory regulations, outside Health Canada's jurisdiction. Note the extent to which EHP people are involved as experts and advisors in national/international standards organizations, or provide expert advice in other ways.

3C Measure the extent to which harmonization is successful in reducing duplication of effort (e.g., standards requirements, regulation, enforcement). Note the extent to which EHP works towards achieving buy-in by other jurisdictions, agencies, non-government groups, and media.

3D Either within EHP or through existing standards organizations (e.g., Standards Council of Canada, Canadian Council of Ministers of the Environment) list existing guidelines/standards/regulations at federal, provincial and municipal levels, at the international level, and through user associations. "Sort out" where EHP fits and track use of future EHP outputs.

3E Explain to "clients" and stakeholders why harmonization is of benefit to them; sell the idea of harmonization. Make information easily accessible to users not only through easier-to-use hard copy, but with person-to-person contact. Help user groups to gain acceptance of their use of EHP products.

4A Measure the effectiveness and cost of direct control (e.g. regulation) vs. alternatives (e.g., incentives) for application of EHP outputs.

4B Existing information about compliance exists, and documents report legislative planning (federal and otherwise). Health Canada has RIAS's and SEIA's already in place.

4C Seek more information about the extent to which harmonization is occurring in direct regulation, or the extent to which the adoption of existing requirements is occurring (regulations by reference to existing standards).

4D Collect information which demonstrates the extent to which data sharing (including the basis for assessment of guidelines and cross-acceptance of laboratory data) is increasing.

4E Identify where it is appropriate to accept/apply international standards and actively promote this approach nationally and internationally (with standards agencies). Become a partner with others to split up (nationally/internationally) tasks that involve EHP, focus on selected topics, and poll results.

There is perhaps one cell external to the matrix and relating to cell 1A. This "cell" would provide for the *internal* feedback to management on the appropriateness of tasks and resources that staff are being requested to work on/with. There needs to be some measure of the extent to which the Department has discussed program usefulness and its ability to respond to mandated tasks, as well as a measure of the extent to which it is involved with, or involves others.

PROGRAM OUTPUTS	ISSUES				
	SETTING MEASURABLE OBJECTIVES A	CONFIRMING EXISTING INDICATORS B	FILL GAPS C	DATA AND INFORMATION NEEDED D	MARKETING E
RESEARCH AND INFORMATION 1	•advance knowledge •control costs •relevance •praticality	•count papers and citations •costs ($ devoted to research) •response to practical needs •colleague and client opinion	•excellence •value added •lead indicators (future value)	•transferability •useability	•recognition of success stories •mutual acceptance of data
PROBLEM SOLVING 2	•prioritizing •degree of spread •mobilization for emergencies •minimum intervention strategies •anticipation	•program evaluation •counting memos, ministerial briefings	•use of information •feedback mechanisms	•client surveys •independent assessment •external assessment	•client recognition of their own responsibilities •citation of information source and feedback •identification of problems
GUIDELINES (AQ, WQ, RE) 3	•practicality •meet needs	•external acceptance as legally binding outside jurisdiction •standards of practice (involvement in voluntary standardization)	•meaures of elimination of overlap (harmonization)	•listing of guidelines at provincial and municipal levels	•identify the gain for all players from harmonization •make information easily accessible (soft copy as opposed to hard copy)
DIRECT REGULATION 4	•effectiveness of control •cost efficiency •efficiency of direct regulation compared with alternatives	•compliance •legislative plan •R.I.A.S. •S.E.I.A.	•harmonization •regulation by referencing	•broaden base of shared data	•promote internationalization of standards

INDICATORS WORKSHOP - WORKING GROUP NOTES
GROUP #2

Overview

Group #2 emphasized the need to ask "clients" how the EHP is helping them and how well the program is doing. Risk assessment, and indicators of the effectiveness of risk assessment, needs more attention, especially if the underlying goals of EHP are tied to risk reduction and risk management.

Presentation Summary

Setting measurable objectives

- Measurement of impact must be broad based, and may be segmented into direct and indirect indicators of program impact

- The dilemma is that we need to have the science model fit program effects; need a connection before we can say it is successful. In reality, we are dealing with risk management problems which have a lack of measurable impacts

- How should indicators deal with scientific uncertainty? Some things are uncertain, while others are certain, but should this affect the usefulness of indicators?

- Whether the advice that EHP provides is accepted by risk managers should be separated from considerations of the effect of the decisions made by risk managers

- Should be looking at indirect program impacts. What is an impact: the consequence of a program's output in terms of the chain of events which occur between the time these outputs are delivered and the ultimate effects of the program component on society or any part thereof

- Should be looking at those factors (outputs) which are used by implementors or clients. Indicators must, however, be linked to some scientific rationale. For example, the publication of CEPA 44 documents alone, without linking them to health outcomes, raised the question "so what?" There needs to be a link between the program and the intention of the program

- Risk assessment activities, and the measurement of these:

    - acceptability of EHP information to the risk manager
    - timeliness of response to program outputs (i.e., risk assessments)
    - does implementation of risk management activity result in a reduction of risk? Indicator may only show a reduction of *exposure*. Must not use just broad environmental levels of exposure; need true exposure

- Specific measurable objectives:
    - acceptability of risk assessment advice to risk managers
    - implementation results in reduction of risk
    - effectiveness of risk assessments (timely, useful, accurate)

Confirming existing and viable indicators

- Types of indicators identified included:
    - compliance indicators
    - sentinel or early warning indicators of non-compliance
    - monitoring indicators. There will however be problems with those programs which are only used once in a while

Filling the gaps: future indicators

- Indicators which are needed to help evaluate effectiveness:
    - how effective we are in delivery; how effectively is advice being taken (and used) by the client(opinion survey)
    - exposure surveys and other baseline health parameters (indirect measurement)
    - client satisfaction; timely information, good science, sound advice, etc. (i.e., opinion surveys)
    - flexibility to meet changing needs (temporal client opinion surveys)

- EHP clients include:
    - other departments
    - provinces
    - public
    - scientific community
    - health professionals

- There are a lot of gaps in health and environment indicators which, once filled, would help give a measure of program efficacy

- Program cost-effectiveness and client satisfaction are noteworthy gaps

INDICATORS WORKSHOP - WORKING GROUP NOTES
GROUP #4

Overview

Group #4 suggested that because baseline data are very limited, many indicators are based on exposure and body burden data (biochemical indicators) which may be below effect levels. Preventive levels of action, which are reflected in subtle changes in health or non-effect, are very difficult to establish, unless on the basis of risk.

Presentation Summary

Program effectiveness/ineffectiveness

- May not need direct health impacts to gauge program impacts; for example, UV warnings have influenced behaviour in terms of avoiding sunlight, but without any improvement in health status. Also, the program placing restrictions on sales of tobacco to young persons may be measured in terms of violations, although this does not mean a reduction in exposure

- Many programs provide exposure guidelines (e.g., air quality); however, monitoring incidences in which these guidelines are exceeded may not provide a direct measure of health impact

Linkages between program impact and exposure reduction

- In some cases, programs will lead to measurable reductions in exposure to specific hazards. For example, blood lead levels in children have decreased following removal of lead in gasoline, and point-of-use treatment devices have reduced exposure to arsenic in drinking water

Linkages between program impact and health status

- In other cases, exposure reduction can lead to quantifiable improvements in health status. For example, reduction in tobacco consumption will lead to a reduction in cancer, as well as cardiovascular and respiratory disease

- Reductions in ambient air pollutants (ozone, sulphates) can lead to quantifiable reductions in cardio-respiratory disease

- To achieve quantifiable measurements, the relationship between exposure and health effect must be well-characterized

Exposure prevention

- Many environmental programs are designed to prevent exposure to new hazards. For example, toxic industrial chemicals may not be permitted for use under CEPA (Note: program failure could occur if a highly toxic substance was missed)

- Toxic food chemicals may not be permitted as food additives (post-market surveillance may be useful in evaluating program effectiveness)

Detection of risk

- Since exposure to many environmental hazards is low, the risk to the exposed population may also be low

- Such risks may be difficult to identify with epidemiologic and toxicologic tools

- Just because risks cannot be measured directly in exposed human populations, however, does not mean that there is no risk

- Although risks may be small, they still need to be managed; the public has an expectation of protection from environmental hazards over which they have no control

Novel health status indicators

- Many environmental hazards have long-term implications (e.g., cancer, persistent environmental contaminants)

- Lack of historical data on relevant indicators may limit our ability to evaluate programs

- New biomarkers of exposure, susceptibility and effect may help in the future (sensitive specific indicators are now emerging)

The path forward

- Should attempt to incorporate "indicators" in ongoing monitoring programs. There are limitations, but in doing it experience will be acquired. Such indicators currently relate primarily to exposure, not effect. Also, must realize that baseline data/measurement is required

- There is a need for prioritization of indicators globally. Coordination is required, as is examination of larger populations

- Provision of the sort of indicators under discussion requires a long-term commitment

Communication

- Endpoints which are short of measurable impact on health are useful indicators; however, such indicators need to be clearly communicated to the "public" (i.e., those individuals requiring indicators)

Measurable objectives for EHP

- Three categories of objectives were suggested:
  - information (current, complete, and scientifically defensible)
  - communications (timely, comprehensible, credible, to the right "people", and identified with the program)
  - reduction in exposure

INDICATORS WORKSHOP - WORKING GROUP NOTES
GROUPS #3&5 (COMBINED)

Overview

Groups 3 and 5, which were combined part way through the proceedings, focused their attention on the midpoint of the EHP program logic chart (i.e., outputs and expected results), conceding that we cannot provide satisfactory indicators of the ultimate objective (reduction in morbidity and mortality), except with respect to occupational health and radiation.

Presentation Summary

Expected results

- Indicators of improvement of health risk management by other bodies
    - extent to which there is adoption of guidelines and standards (e.g., water quality) by provinces, or adoption of new measurement techniques
    - match between public and professional perception of risk
    - changing the public priorities of others (e.g., health units) because of knowledge developed
    - changes in educational material
    - curriculum changes (i.e., incorporation of material on environmental/health links)
    - phasing out of a chemical or device by industry
    - use of alternative chemicals/devices by industry
    - someone begins monitoring a chemical
    - communication by other bodies to their stakeholders of information from Health Canada (i.e., references to HC or EHP)

- Indicators of compliance
    - company "complies" with desired outcome of EHP without regulation (i.e., a function of consultation and education)
    - company again complies, but in response to a standard which is in a guideline or regulation
    - Bill C-62 compliance plans

- Indicators of informed decisions
    - survey joint health and safety committees regarding changes in use of chemicals
    - existence of workplace programs (e.g., UV protection)
    - sales of preventive products (e.g., sunbloc)
    - number of articles in occupational health and safety professional and trade journals regarding preventive programs
    - survey of public awareness and behaviour

- Indicators of reduction in excessive human exposure
    - multi-media sampling of selected substances
    - body-burden sampling
    - phase out of substance or device
    - determination of behaviour change